A CROSS SECTIONAL STUDY ON PREVALENCE OF THE COMMON EAR PROBLEMS AMONG GOVERNMENT PRIMARY SCHOOL CHILDLREN IN KANCHEEPURAM BLOCK OF KANCHEEPURAM DISTRICT, TAMIL NADU-2012

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CERTIFICATE

This is to certify that the dissertation titled **'A CROSS SECTIONAL STUDY ON PREVALENCE OF THE COMMON EAR PROBLEMS AMONG GOVERNMENT PRIMARY SCHOOL CHILDLREN IN KANCHEEPURAM BLOCK OF KANCHEEPURAM DISTRICT, TAMIL NADU-2012'** is a bonafide work carried out by **Dr. P.GETRUDE BANUMATHI**, Post Graduate student in the Institute of Community Medicine, Madras Medical College, under my supervision and guidance towards partial fulfillment of the requirements for the degree of M.D. Branch XV Community Medicine and is being submitted to The Tamilnadu Dr.M.G.R.Medical University, Chennai.

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ABBREVIATIONS LIST

AOM	-	Acute Otitis Media
CSOM	-	Chronic Suppurative Otitis media
DB	-	Decibel
DF	-	Degree of Freedom
FB	-	Foreign Body
HI	-	Hearing Impairment
NSSO	-	National Sample Survey Organisation
OME	-	Otitis Media with effusion
OR	-	Odds Ratio
SOM	-	Secretory Otitis media
SPSS	-	Statistical Package for Social Science
SS	-	Statistically Significant
TM	-	Tympanic Membrane
URI	-	Upper Respiratory Tract Infection
W.H.O	-	World Health Organisation

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INTRODUCTION

1. INTRODUCTION

Ear is one of the sense organs in the human body which plays a vital role in the over all development of an individual. Auditory sense is particularly important sense, as it allows us to communicate with external world. The ear diseases can cause discomfort or hearing impairment which interferes with communication skills and productivity of an individual. In children such a problem may result in poor development in speech, language, education, listening capacity and many psychosocial problems which can hinder the overall development of an individual. Hearing impaired children and adults are often stigmatized and socially isolated [1].

Ear problems and hearing impairment are important community health problem among school children especially in developing nations. About 50% of ear diseases occur among the paediatric age group below 15 years and complications are high in this age group[2.] WHO also stated that ear diseases to be considered as public health problems when the prevalence of CSOM among paediatric age group is more than 4% and recommended need for appropriate screening programs of school children for early detection of ear diseases and hearing impairment to prevent psycho social consequences[3].

Burden of the disease:

Loss of hearing is the second major cause for Years with Disability, (YLD) first being depression. It is responsible for 24.9million years lived with Disability globally and gives it a larger non fatal burden than alcohol related disorders, osteo arthritis and schizophrenia[4] . Over three billion dollars are being spent every year in the United States of America for treatment of otitis media[5] . As per the Canadian

study the money which has been spent in treating otitis media represents 60% of what is necessary for diabetes mellitus treatment or 40% what is spent to treat diseases like emphysema, chronic bronchitis, and asthma[6] .

Global scenario:

WHO stated that during 2004 that 275 million people suffer from hearing impairment and 80% of them from low and middle income countries. The extensive systematic literature review of various studies conducted by Lorenza et al in 15 countries of WHO region estimated that overall incidence of acute otitis media(AOM) is 10.85%, ie 706 million cases occurs every year among which 51% reported from children. It has been estimated that chronic suppurative otitis media (CSOM) incidence is 4.76%, ie 31 million cases per year, among which 22.6% occurring among children. The prevalence of otitis media causes hearing impairment is 30.32 per thousand and every year 21 thousand people die due to complications of otitis media. The incidence of AOM and CSOM in developed nations are less than 5% and 3% respectively compared to the developing nations which range from 9 to 30% respectively[7] .

Indian scenario:

As per WHO estimates, in India, there are 63 million people suffering from hearing impairment, this places the estimated prevalence of 6.3% in total Indian population. As per National Sample Survey Organization (NSSO) survey, there are 291 persons per one lakh people are suffering from hearing impairment. Rural population has been more affected than urban population. The most common causes among hearing impairment are ear wax, CSOM, and otitis media with effusion (OME) [8].

Risk factors:

Reports from some south India and western studies reveal that a number of extrinsic and intrinsic risk factors which may predispose a child to otitis media. The attributable risk factors are poor socioeconomic status, younger age male sex, Low parental education, sibling are parents suffering from otitis media, recurrent respiratory tract infections, allergic rhinitis, snoring (due to adenoids) and passive smoking Some of the developing countries reveal that the large family size, over crowding, and exposure to wood smoke among households are the important risk factors[9].[10]

Common ear problems:

A significant proportion of hearing loss cases are due to common ear disorders which diagnosed early and treated properly can reduce the burden of hearing impairment. According to WHO and Government of India collaboration program (2006-2007) the following are the common ear conditions leading to hearing impairment. The conditions are ear wax, acute suppurative otitis media, otitis externa, Otomycosis, Chronic suppurative otitis media and Otitis media with effusion[11]. This study also addresses the above said ear problems.

More than 70% of all children have atleast One middle ear infection is evidenced by the age of 6years.[12] . In rural area 70% of Indian population are residing till today. Most of the rural places still have limited access to the specialist care . So the rural area government primary school children of Kanchipuram block were taken for this survey. This study was planned to estimate the prevalence of common ear problems and associated factors with ear problems among government primary school children of Kanchipuram block.

OBJECTIVES

2. OBJECTIVES

1) To estimate the prevalence of common ear problems among Government primary school children in Kancheepuram Block.

2) To estimate the prevalence of associated factors with ear problems among the study population.

JUSTIFICATION

3. JUSTIFICATION

1. WHO says at least 80% of the ear problems are reported from the developing Countries. Similarly, the prevalence of hearing impairment is also high among the developing nations causing serious public health problems.

2. At least 50% of the ear problems occur among the pediatric age group.

3. WHO has indicated that the prevalence rate of Chronic Suppurative Otitis Media (CSOM) is greater than 4% in a defined population of children is an indication of major public health problem requiring urgent and specific attention. [3].

4. Serious consequences like hearing impairment, complications due to otitis media and psychosocial problems which in turn impose heavy burden to individual, family, community and the country.

5. A large percentage can be treated through early diagnosis and suitable management. 50% of all ear diseases are preventable [13] by primary prevention.

6. School Children are easily accessible and Ear diseases picked up among them can be subjected to easy and continuous monitoring and follow up. School survey is very useful parameter to screen more number of children for a particular age group.

7. Government primary school children, because of their low socio economic status and living conditions are more prone to ear problems than the private school children.[14] [15]

8. Around 70% of people live in rural area in Tamil Nadu. Still the rural area has its own drawbacks like inaccessibility to specialist care, poor socio economic status

9. After exhaustive review literature Very few published studies are available in India and Tamil Nadu.

REVIEW OF LITERATURE

4. REVIEW OF LITERATURE

The studies conducted in ear diseases, hearing impairment and risk factors among the primary school children in different socio economical structure shows wide variation. Even mild to moderate hearing impairment may result in poor educational achievements[16]. Due to recent developments in standard of living available health facility and potent antibiotics over the past few decades the serious complications of ear problems like mastoiditis, brain abscess, meningitis, severe form of hearing impairment have shown marked reduction. However especially in developing nations the problems like ASOM CSOM ,complicated with mild to moderate hearing impairment is not uncommon , still pose serious public health problems.

4.1 Prevalence of ear problems:

4.1.1 Global scenario:

A study conducted among 2430 first year school children in Swaziland(1994) by swart et al has reported that 16.8% had an ear problems. The most common ear problem was ear wax with the prevalence rate of 74/1000. Middle ear disease prevalence rate was 30/1000 [13].The hearing impairment was found in 5.5% of children.[17]

In a cross sectional study conducted among 854 school children aged 6-13 years by a Inga bastos et al in Tanzania (1993) has identified that prevalence of chronic otitis media was 1.6%,. Prevalence of hearing loss above 30 decibels was

3%. Cerumen was present 10% of urban children and 9.9% of rural children. AOM was present in 0.2% of urban and 0.7% of rural children [18]

J.Hatcher et al done a cross sectional study among 5368 school children of age group 5-14 years in Kiambu district of Kenya at 1992 has revealed that wax was present in 8.6%, CSOM 1%, hearing impairment 5.6%, 10% had hearing impairment in those ears with wax obstructing the tympanic membrane[19]

Prevalence of otitis media survey among 591 children aged 3- 7 years in 2 towns of Greenland(1994) by Prebenhomoe et al has revealed that AOM prevalence 1.5 % and 1.3%, COM 6.8% and 11.7%, CSOM 0.9 %and 3.8% and otitis media with effusion 23 and 28.2% [20] respectively.

A cross sectional study among 5528 primary school children in Zimbabwe conducted by Brain D et al (2004) identified that overall 135 students(2.4%) having hearing impairment.79 students (1.4%) having conductive hearing loss ,56 students(1%) having sensorineural hearing loss. Cerumen impaction present in 25% of children. AOM in 3.4%, COM in 24% and Otitis media with effusion in 32% of children. [21]

Ricardo et al conducted a cross sectional epidemiological survey among 1119 children aged 6 to 18 years in Latin America found that 118 (11.3%) children had wax occluding the right ear and 120 (11.5%) children had occluding wax in left ear. 71 (6.8%) children had wax accumulation in both ears. Prevalence of otitis media. .94%,.[22.]

Kamal Eldin et al surveyed 200 children aged 4 to 12 years in an ENT outpatient clinic in Egypt and identified that 25% had middle ear problem. 5 % had chronic suppurative otitis media with perforation. 18 of them found to have mild hearing loss. [23]

A Prospective cross sectional study done by Prakash Adhikari etal among 2000 rural school children aged between 5 and 13 years(2006-2008) in Nepal. They found that out of 2000 children 1240 (62%) had ear wax, 153 (7.6%) had CSOM,, 94 (4.7%) had otitis media with effusion, 28(1.4%) children had AOM, 28 (1.4%) had otitis externa, Otomycosis 24(1.2%), FB (1.2%), other causes of ear problem (3.3%). over all ear disorders were present in 81.6% of children. Ear discharge was present in 197 children. Ear ache in 162 (8.1%), Ear block in115 (5.75%) and itching of the ear 74 (3.7%) and hearing impairment was present in 185 (9.25%) Children[24] .

In 1984 and 1985, 2664 Jerusalem children aged from 8 years to 13 Years surveyed by David Et al has revealed that 1.5% of children suffered from secretory otitis media with effusion, 0.3% from CSOM, 0.7% from Cholesteatoma (unsafe CSOM). Total Number of children with middle ear pathology 132 (4.9%). . Only 1 % of them were found to have proven hearing loss [25.]

Skarynski et al done a study among 92876 Children of Polish schools found that the percentage of 7 years odds whose having Hearing impairment 13.7%, Percentage of children 8 to 12 Years odds having Hearing impairment 15.1%.[26 .]

A cross sectional study done among 234, 5th Std Malaysian children by Mohd khairi a et al (2009) revealed that the prevalence of hearing loss was 15%, 88.9% having conductive hearing loss. Otitis externa right and left ear 0.4 % and 0.8% . Wax

in right and left ear 18.3% and 19.1%. Otomycosis right and left ear 0% and 0.4%. CSOM in right and left ear 1.2% and 0.4%. Otitis media with effusion right and left ear 8.6% and 11.3%, Acute otitis Media right and left ear 0.4% and 0 %. [27]The most common ear disease was impacted ear wax. 38.9% were having problems in both ears.

A Prospective study carried out by Akilchandra Biswas etal among 225 rural and urban primary school children age group 4 to 13 years of Magura and Dhaka District. The prevalence of CSOM was found to be(12.44%) rural children and (2.2%) of Urban children. O. No case of CSOM was found in higher income group families. In rural area small number of people (5.78%) used cotton buds to clean ear. (37.7%) used match stick, 4.33% used cloth with stick and (6.67%) used chicken feathers and (8.4%) used other materials for ear cleaning. in Urban children used (47.55%) cotton buds, match stick (18.67%) cloth with stick (22.67%) cloth with stick (22.6%) and others (11.11%). This study shows (53.57%) cases had a definite history suggestive of AOM. [27] .

Waquar – Uddin Etal surveyed 1473 children ,831 from Government school and 642 Private School children of Islamabad.(2007) In Government school 15 (1.8%) children had CSOM, In private school children 8 (1.24%) had CSOM.. So the point prevalence in government school groups was not very much different from private schools. [28]

A cross sectional study conducted by Adikari Et al among 500 children aged 5 to 15 years from urban private schools of Nepal(2006) .He found that the prevalence of CSOM in children 5%. Unilateral disease was seen in 72%. Among them 76% had

a tubotympanic CSOM type (Safe type), 24% had atticoantral (Un safe type) of CSOM. [29].

Yang Chen Etal done a cross sectional survey among 1567 students selected from 29 secondary schools (8,9,10th grade) 29th Schools of China. He found that 23 students had mild hearing impairment, 4 had moderate hearing impairment, 2 had severe hearing impairment. The percentage of ear diseases was 3.32% in total. External ear diseases were 1.2%, middle ear diseases 0.64%, and sensorineural hearing loss 1.47%. The percentage of ear diseases was significantly higher among boys than girls. . [30].

A case control study done by Elemraidma Et al among 75 children with CSOM and 75 with controls of Yemini children. Disability hearing impartment more than 30 sdB was presenting 51.5% right ear and 66.7% left ear children with CSOM. The cases had lower academic performance than controls with the OR 15.31, and the P value < 0.001. [31].

1991 nation wide survey of deafness and ear diseases in Nepal done by Brinos. They found that 2.7 million people out of 19 million were significantly deaf. 1.5 million had abnormal ear drums indicative of preventable ear disease. Middle ear infection or its complication causes 32% of hearing impairment. 70% of those suffering from middle ear infection or sequelae are of school age children. 61% of individuals aware of ear diseases.. 50% of all ear diseases are preventable. [13].

I Kandari et al conducted a survey, among 159 Kuwait school children aged 6 to 12 years with Otoscope, Tympanogram and Audiogram, they found that 120 children were having normal ear drum, 39 children had abnormal results. The

abnormalities were 21 children with ear wax ,16 children with secretary Otitis media and 2 children with sensorineuaral hearing loss. [32].

Moniudmi et al screened 196 students from Government, private and language primary schools of Alexandia. They screened with questionnaire, audiometry and Tympanometry. By audiometry 24.49% had HI, By Tympanometry 36.22% had hearing loss. Boys were more likely to have hearing impartment than girls. 48% of failed students in audiometry were poor achievers in schools as stated by teachers. Crowding at schools shows significant association with ear problems and hearing impartment. [33].

Damian mc shane et al estimated the prevalence of middle ear disease among American Indian Children. He identified that the prevalence of middle ear disease 20% to 25% in American Indian children. In General childhood population it was around 5%. American Indian children were having more middle ear disease. It can be explained by that they are relatively low socio economic group [34].

By the Global program on evidence for Health policy discussion 2002, there were 10 leading causes of years lived with disability (YLD), among them hearing loss is the 2nd leading cause of YLD which is 4.7%. Unipolar depressive disorders are the first leading cause of YLD which is 12.1%.[35].

A prospective study done among 1245 school children of Kathmandu Valley of Nepal age group 5 to 12 years by Prakash Adikari Etal from June 2007 to May 2008. He revealed that the most common Otological disease was 60.60% followed by CSOM 5.7% and OME 3.7%. In CSOM there was 85.9% having safe type, ,

Otomycosis 1.2%,AOM 1.4% and Otitis externa 1%. The overall Ear problems were present in 75.7% of children. [36].

4.1.2 Prevalence in India and Tamil Nadu

A study of ear, nose and throat disorders done by Amar Singh et al in the Lahaul block in district of Lahaul and Spitti, Himachal Pradesh from 20–26 June 2007 on 1452 members of general population. 4.31% of them were suffering from ENT disorders. Among them, 36.6% had ear problems. Among them, CSOM was the commonest comprising 32.75%. Paediatric patients with CSOM were 12.7%. (39)

An article by Vinayaka KC Manchaiah et al in 58th round survey by National Sample Survey Organisation in 2002 revealed that among 3,061,700 surveyed, 16.56% had some form of hearing impairment. In 1999 WHO survey, they found that 5.9% of the population had disability hearing impairment. (40)

A survey done by R. S Pheendra Rao et al on hearing impairment and ear diseases among 855 first year school children in South India (2001) revealed that hearing impairment was present in 11.9% of children. Prevalence of ear diseases was 68.1%. among them, ear wax was present in 63.1%, CSOM in 1.6%, Fungal infection in 0.2%, otitis externa in 1.5%, OME in 0.1%, dry perforation in 1.4%, foreign body in 0.1% children. Impacted wax was found to be the most common cause of hearing impairment. (41)

A Sophia et al did a survey on risk factors for otitis media among 800 preschool, Indian rural children in K.V Kuppam block of North Arcot district during April 2007 revealed 28.5% of children had wax, AOM in 1.5% children, otitis media

with effusion in 6% children, CSOM in 1.4% children and otitis externa in 0.1% children. [9]

In 1997 Annie Jacob et al did a study among primary school children in North Arcot District of Tamil Nadu. They found that overall prevalence of ear problems excluding wax was 21.5%. Ear wax was found in 29.8% of children. Chronic otitis media- safe type 5.3%, unsafe type 2.5%, otitis media with effusion – 9.9%. 11.9% 0f children had hearing impairment.91.2% children had hearing impairment with otitis media. In children with wax, 42.3% showed mild conductive impairment which resolved after removal of wax. [37]

A cross sectional study was conducted among 914 children of primary school and preschool age by Rupa et al in North Arcot district in Tamil Nadu found CSOM prevalence among primary school children was 6.2%, among them 1.2% have unsafe type of CSOM. Impacted wax was found in 15% of school children and 12.1% of preschool children.[38]

4.2 Risk Factors Associated with ear Problems

Socioeconomic Status

It is generally concluded that ear problems have a higher prevalence in communities of lower socioeconomic group due to their poor living standards.

Akil Chandra Biswas et al in Dhaka City found that poor socioeconomic group people affected more with CSOM[27]. Rao etal donea study in Karanataka state revealed that hearing impairment was significantly lower among children belonging to

higher socioeconomic group[41]. D.W Teele et al [42] in Boston Study and A.O. Hassi et al in Nigeria study found the same findings[45.]

Overcrowding

Overcrowding increases the risks of otitis media, this was found significant by S.A. Zeissel etal among Akican American Children, and D.M. Fliss etal among Israel children.[47,48]

Younger age

A Study conducted by S.A. Zeissel etal among African American children, and R. Caylon etal among Turkey children, revealed that younger age group are affected more with ear problems.[47,44]

Maternal Education

Moreover, maternal education has got direct relation with personal hygiene, health awareness, treatment seeking behaviour nutrition and other factors influence the better healthly lifestyle of the child. This was proven by A.K. Verma etal[60.]

Passive Smoking

The effect of cigarette smoke is will paralyse the cilia and damages the respiratory epithelium makes more prone to bacterial infections. This could result in persistent rhinorrhoea and subsequent otitismedia. A study done by A. Sophia etal in rural south India found that a child who had passive exposure to cigarette smoking by parents or care takers was 3.3 times more likely to have otitis media[9].This association was also shown by M.Uhari etal, C. Stenstrom etal and R.A. Etzel etal[49, 50,

[52].A.E.Hinton identified that one third of the middle ear effusion may be attributable to passive smoking and there appears to increased admission of children for surgery when parents smoke[74.]

Recurrent Respiratory tract infection:

Recurrent Respiratory tract infections cause retained secretions in nasal cavity and also in nasopharynx. They form a good medium for pathogenic bacteria to thrive and finally reach the Eustachian tube to the middle ear.

A. Sophia etal in rural South India, E.L.Vander veen etal among pacific islands children, J.E Paterson etal and H. Guna Sekara etal showed significant association between recurrent respiratory tract infections and otitis media [9, 59, 53, 56].

Snoring

Enlarged obstructive adenoids and tonsils are a common cause for snoring. The children who are having snoring problem are more prone for otitis media. A Sophia et al in rural south India study found that the children who are having snoring problem was 4.89 times more likely to have otitis media, and the study conducted by Paterson et al found that OME is more common among children who snore [9, 53].

Allergic Rhinitis

Allergy not only obstructs the Eustachian tube by oedema but also lead to increased secretory activity as middle ear mucosa act as a shock organ in such cases.Allergic Rhinitis has been found to be an important risk factor for otitis media. This was found by C. Stenstrom et al[50].

Wood smoke

Exposure to wood smoke increases the risk of otitis media, as wood smoke releases the materials like carbon monoxide, nitrogen dioxide etc, which damages the respiratory epithelium (which causes recurrent respiratory tract infection) in turn causes otitis media. This risk factor association was proven by Y.B. Amusa et al among African population, J. Xenelin et al and A.O Lasisi et al [51, 46, 54].

4.3 .Table 1: Common ear problems[11]

Common Ear problems	Type of infection
Impacted wax	External Auditory Canal infections
Oto mycosis	
Otitis externa	
Acute otitis media	Middle ear infections
Otitis media with effusion	
Chronic suppurative otitis media	

4.3.1 IMPACTED WAX (OR) CERUMEN:

Ear wax is a mixture of secretions from 2 different gland types, ceruminous and pilosebacious glands with hair, keratin, desquamous epithelial debris and dirt.[61] Secretions of sebaceous and ceruminous glands mixes with the desquamated epithelial cells and keratin shed from the tympanic membrane and deep bony meatus to form wax. Wax has a protective function to the individual as it lubricates the ear canal and entraps any foreign material that happens to enter the external auditory canal. The quantity of the wax produced varies greatly from one individual to another and its

composition varies in different racial groups. . Some factors like narrow and tortuous ear canal, stiff hair, are obstructive lesion of the canal may favour retention of wax more. It will dry up and forms the hard impacted mass.

Symptoms:

Patients may pay present with Ear pain, Ear block, Itching in ear, and decreased hearing..

Treatment:[11]

1.In the case of severe pain analgesic should be given.

2. Wax softener ear drops, 3-5 drops three times a day for 4-5 days.

3. Removal of the wax by gentle syringing. . .

4. Ear canal should be inspected from time to time to see if all wax has been removed.[(61) (62) (63)]

Advice to the patient

Not to instill oil in the ear

Not to use ear buds or any sharp material for ear cleaning.

4.3.2 OTOMYCOSIS:

Otomycosis is a fungal infection of the ear canal that often occurs due to Aspergillus nigger, A. fumigatus or Candida albicans. It is seen in hot and humid climate of tropical and subtropical countries. Secondary fungal growth is also seen in

patients using topical antibiotics for treatment of otitis externa or middle ear suppuration.[62) 61)]

Symptoms

The clinical features of otomycosis include: intense itching, discomfort or pain in the ear, watery discharge with a musty odour, and ear blockage.

Otoscope Examination

Examination of ear canal reveals a mass of greyish white debris resembling wet bloating paper filling the meatus.

Treatment[11]

1. Treatment consists of thorough ear toilet to remove all discharge and epithelial debris . It can be done by syringing, suction or dry mopping. .

2. Antifungal drops ear drops three times a day,Antifungal agents include,Nystatin, clotrimazole and povidone iodine. 2% salicylic acid in alcohol is also effective. . Antifungal treatment should be continued for a week even after apparent cure to avoid recurrences.

Advice to the patient

Ear must be kept dry.

4.3.3 OTITIS EXTERNA

Definition:

Otitis Externa is the generic term applied to all inflammatory conditions of the external meatal skin. It may be genetically influenced by narrow canal, excessive wax accumulation or and inherited tendency to eczema environmentally induced by heat, humidity and swimming. It may be traumatic and self induced through match sticks and hair pins or safety pin[62 63]

Otitis externa may be divided, into

1. Localised otitis externa (Furuncle)
2. Diffuse otitis externa

1. Furuncle (localised acute otitis externa).

A furuncle is a staphylococcal infection of the hair follicle.Patient usually presents with severe pain and tenderness which are out of proportion to the size of the furuncle. Movements of the pinna are painful. Jaw movements, as in chewing, also cause pain in the ear. Periauricular lymph nodes (anterior, posterior and inferior) may also be enlarged and tender.

2. Diffuse otitis externa.

It is diffuse inflammation of meatal skin which may spread to involve the pinna and epidermal layer of tympanic membrane. Aetiology. Disease is commonly seen in hot and humid climate and in swimmers. Two factors commonly responsible

for this condition are: (a) trauma to the meatal skin, and (b) invasion by pathogenic organism

Trauma can result from scratching the ear canal with hair pins or match sticks, unskilled instrumentation to remove foreign bodies, vigorous cleaning of ear canal after a swim when meatal skin is already macerated. Break in continuity of meatal lining sets the ground for organisms to invade. Some cases of otitis externa are secondary to infection of the middle ear, or allergic sensitisation to the topical ear drops used for chronic suppurative otitis media.

Signs and symptoms[11]

Pain and heaviness in the ear.

Tenderness and swelling of ear canal.

Decreased hearing.

Serous and purulent discharge oozing from the ear.

Treatment[11]

Topical ear drops (steroid and antibiotic combination)

10% ichthammol glycerine packing (to be changed or removed after 24hrs)

Anti-inflammatory drugs and analgesics

Systemic antibiotics (amoxicillin+cloxacillin/amoxicillin)

In case of recurrent furunculosis in children, attention should be paid to the nasal vestibule which may harbour staphylococci and the infection transferred by their own fingers.Staphylococci infections of the skin as a possible source should also be excluded and suitably treated.

Advise to the patient

Do not scratch the affected ear canal with pointed objects.

Keep the ear dry.

OTITIS MEDIA Otitis media is the infection in the space behind the ear drum. It is one of the most common childhood infectious diseases worldwide. More than 70% of children have atleast one middle ear infection before the 6th birthday. Among them, 5-10% of patients turn to chronic otitis media which eventually causes hearing loss and sequelae[11.] Otitis media comprises acute otitis media, otitis media with effusion and chronic Suppurative otitis media[9]

4.3.4 ACUTE SUPPURATIVE OTITIS MEDIA

Definition: It is an acute inflammation of middle ear by pyogenic organisms. Here, middle ear implies middle ear cleft, i.e. Eustachian tube, middle ear, attic, antrum and mastoid air cells. Or abrupt infection of the middle ear for short duration[65].

Eetiology:

Via Eustachian tube: The Eustachian tube of the young children is relatively incompetent. Most middle ear infection probably occurs as a result of ascending infection by this route, usually after an upper respiratory infection. Swimming and diving can also force water through the tube into the middle ear[9]

Via external ear : Traumatic perforations of tympanic membrane due to any cause open a route to middle ear infection

Pre disposing factors:

Recurrent attacks of upper respiratory tract infections, common cold and exanthematous fevers like measles, Tonsillitis and adenoid hyper trophy, Chronic sinusitis, Rhinitis,Cleft palate and nasal allergy[61]

Signs and symptoms

Earache. fever decreased hearing, Tympanic membrane congestion or bulging, sometimes with perforation.

MEDICAL TREATMENT[11]

Antibacterial therapy ;It is indicated in all cases with fever and severe ear pain. Decongestant nasal drops- can be used for 2 to 3 days.

Analgesics and antipyretic helps to relieve pain and bring down temperature.it should be given for three days or till the symptom subside.

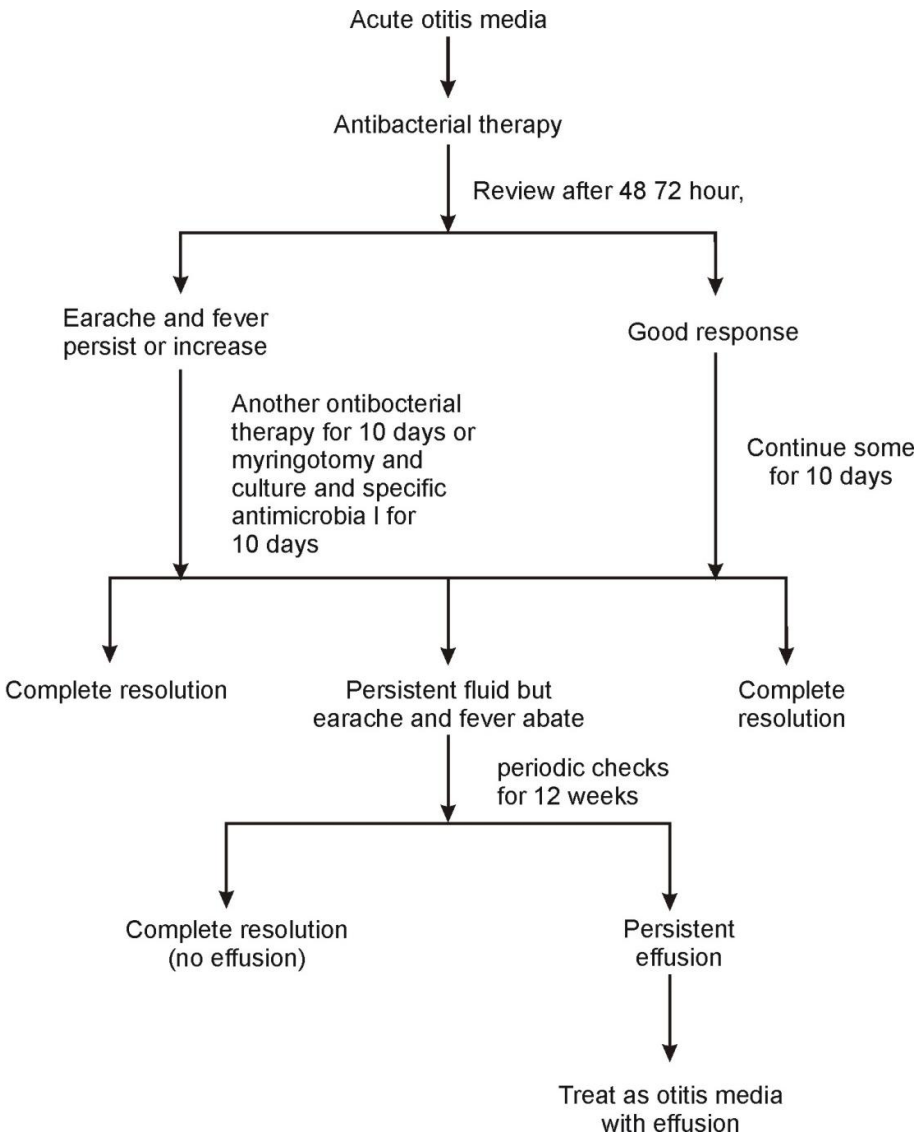
E**ar toilet :**If there is discharge in the ear, it is dry mopped with sterile cotton buds and a wick moistened with antibiotic may be inserted**..**

Dry local heat ;It helps to relieve pain.

Advise to the patient

Keep the ear dry.In case of discharge,dry mopping of the ear with the clean cotton stick.Not to put any indigenous ear drops.

Fig 1.0 Treatment & Followup for AOM :-



The majority of complications followed by acute infection (74%) occurs with children.(below 15 yrs).In parts of the world children may sometimes present with intra cranial complications as the first indication of acute otitis media.[66]

All cases of acute suppurative otitis media should be carefully followed till drum membrane returns to its normal appearance and conductive deafness disappears.

Table 2.0 Antibacterial agents and their dosage in acute otitis media

Drug	Total Daily Doses	Divided Dose
Amoxycillin	40 mg/kg	3
Ampicillin	50-100 mg/kg	4
Co-amoxiclav	40 mg/kg	2-3
Erythromycin	30- 50 mg/kg	4
Cefaclol· (II generation)	20 mg/kg	2-3
Cefixime (III generation)	8 mg/kg	1 or 2
Cefpodoxime proxetil	10 mg/kg (max. 2 400 mg/day)	2
Ceftibuten (II I generation)	9 mg/kg	1
Co-trimoxazole (Trimethoprim + Sulphamethoxazole)	8mg (TMP) + 40 mg (SMZ)/kg	2

ref : 61

4.3.5 OTITIS MEDIA WITH EFFUSION

Serous Otitis Media

(Syn. Secretary Otitis Media, Mucoid Otitis Media, "Glue Ear"). Otitis media with effusion and middle ear effusion terms are currently acceptable [67].

Fig 2.0 Effects of acute and prolonged tubal blockage

Acute tubal blockage

↓

Absorption of middle ear gases

↓

Negative pressure in the middle ear

↓

Retraction of tympanic membrane

↓

Transudate in middle ear/haemorrhage (acute otitis media with effusion)

Prolonged tubal blockage / dysfunction

↓

Otitis media with effusion (thin watery or mucoid discharge)

↓

Atelectatic ear / perforation

↓

Retraction Pocket / Cholesteatoma

↓

Erosion of incudostapedial joint

This is an insidious condition characterised by accumulation of non-purulent effusion in the middle ear cleft. Often the effusion is thick and viscid but sometimes it may be thin and serous. The fluid is nearly sterile. The condition is commonly seen in school going children.

Aetiology

The causes are:Adenoid hyperplasia,Chronic rhinitis and sinusitis,Chronic tonsillitis. Enlarged tonsils mechanically obstruct the movements of soft palate and interfere with the physiological opening of eustachian tube.Palatal defects, e.g. cleft palate, palatal paralysis.

Allergy : Seasonal or perennial allergy to inhalants or foodstuff is common in children. This not only obstructs eustachian tube by oedema but may also lead to increased secretary activity as middle ear mucosa acts as a shock organ in such case.[9]

Viral infections; various adeno and rhinoviruses of upper respiratory tract may invade middle ear mucosa and stimulate it to increased secretary activity.

Symptoms: :

Hearing loss.

This is the presenting and sometimes it is the only symptom. Deafness may pass unnoticed by the parents and may be accidently discovered during audiometric screening tests.The hearing fluctuates in severity particularly in relation to seasonal change and presence or absence or absence of intermittent infection.

Delayed and defective speech

Because of hearing loss, development of speech is delayed or defective.

Mild earaches.

There may be history of upper respiratory tract infections with mild earaches.

Signs

Tympanic membrane is often dull and opaque with loss of light reflex. It may appear yellow, grey or bluish in colour. Thin leash of blood vessels may be seen along the handle of malleus or at the periphery of tympanic membrane and differs from marked congestion of acute suppurative otitis media. Tympanic membrane may show varying degree of retractio. Fluid level and air bubbles may be seen when fluid is thin and tympanic membrane transparent. Mobility of the tympanic membrane is restricted.

Hearing Tests

1. **Tuning fork tests** : show conductive hearing loss.

2. **Audiometry**: There is conductive hearing loss of 20-40dB.

3. **Impedance audiometry**: It is an objective test useful in infants and children. Presence of fluid is indicated by reduced compliance and flat curve with a shift to negative side .

Treatment

The aim of treatment is removal of fluid and prevention of its recurrence.

A. MEDICAL

1. **Decongestants:**Topical decongestants in the form of nasal drops, sprays or systemic.

2. **Antiallergic measures:**Antihistaminics or sometimes steroids may be used in cases of allergy. If possible, allergen should be found and desensitisation done.

3. **Antibiotics:**They are useful in cases of upper respiratory tract infections or unresolved acute suppurative otitis media.

4. **ADVICE TO THE PATIENT :** Patient should repeatedly perform Valsalva manoeuvre. Sometimes, politzerisation or eustachian tube catheterisation has to be done. This helps to ventilate middle ear and promote drainage of fluid. Children can be given chewing gum to encourage repeated swallowing which opens the tube.

B. SURGICAL- if the symptoms or signs are persistent inspite of appropriate medical treatment, surgical options may be considered..Surgical treatment of causative factor includes Adenoidectomy, tonsillectomy and/or wash-out of maxillary antra, may be required.More than 64% of of otolaryngologist advised adenoidectomy as a part of treatment for otitis media with effusion.

4.3.6 CHRONIC SUPPURATIVE OTITIS MEDIA

Definition:

Defined as 'Chronic (or) intermittent otorrhoea through a persistent non intact tympanic membrane'. The reference to a non intact tympanic membrane in most cases

denotes a perforation, but can also include discharge through a ventilation tube.[60].CSOM is a long-standing infection of middle ear cleft with ear discharge and permanent perforation. When its edges are covered with squamous epithelium and it does not heal spontaneously a perforation becomes permanent.[65]

Types of CSOM:

1. Tubo tympanic type(safe type)
2. Attico antral type(un safe type)

TUBO TYMPANIC TYPE (Safe type):

It is also called the safe or benign type. It involves the antero inferior part of middle ear cleft i.e. Eustachian tube and mesotympanum and is associated with central perforation. The risk is less when compared to atticoantral type.

ATTICO ANTRAL TYPE (Unsafe type):

Attico antral type involves postero superior part of middle ear cleft and is associated with cholesteatoma. Due to bone eroding properties, it causes risk of serious complications. For this reason, the disease is called unsafe or dangerous type.

Etiology:

The disease most commonly starts in childhood and is therefore common in that age group.

1. It is the sequelae of the acute otitis media and leaving behind a perforation.

2. Ascending infection via the Eustachian tube mostly from tonsils, adenoids and infected sinuses may be responsible for persistent or recurrent otorrhoea.[9]

3. Due to allergy to eggs, fish and milk, persistent mucoid otorrhoea can occur.

Table 3.0 DIFFERENCES BETWEEN ATTICO ANTRAL AND TUBO TYMPANIC CSOM[60 64]

Symptoms and signs	Tubo tympanic	Attico antral
Discharge	Profuse, mucoid, colourless	Scanty, purulent, foul smelling
Perforation	Central	Attic or marginal
Granulomas	Uncommon	Common
Polyp	Pale	Red and fleshy
Cholesteatoma	Absent	Present
Complications	Rare	Common
Audiogram	Mild to moderate conductive hearing loss	Conductive or mixed hearing loss (Some have normal hearing)
Treatment	Medical and surgical	Surgical

Investigation for CSOM tubotympanic and attico antral type

1. Examination under Microscope :

2. Audiogram : It provides us an assessment of level of hearing loss and its type

3. Culture and Sensitivity of ear discharge : It helps to select proper antibiotic ear drops

4. Mastoid X-rays/CT scan temporal bone: Mastoid is usually sclerotic,. Bone destructions' presence is a feature of atticoantral disease.

Treatment for tubotympanic type of Csom[11]

1. Aural toilet: Remove all discharge and debris from the ear. This can be done dry mopping with absorbent cotton buds and with suction clearance

2. Ear drops: Antibiotic ear drops like neomycin, polymyxin, chloromycetin or gentamicin are used or combined with steroids which will provide local anti-inflammatory effect.

3. Systemic antibiotics : They are useful in acute exacerbation of chronically infected ear

4. Precautions: Patients are instructed to keep water out of the ear during swimming, bathing and hair wash. To prevent this, rubber inserts can be used

5. Treatment of contributory causes: Attention should be given to treat simultaneously for infected tonsils, adenoids, maxillary sinusitis and nasal allergy.

6. Surgical Treatment: Aural polyp or granulations if present should be removed. It will facilitate ear toilet & permit the ear drops to be used effectively.

7. Closure of perforation: when the ear is dry myringoplasty with or without ossicular reconstruction can be done to restore hearing. Closure of perforation will also prevent repeated infection from the external canal.[38]

Treatment for atticoantral type (unsafe type):

1. Surgical:

It is the mainstay of treatment. Primary aim is to remove the disease and make the ear safe, and to preserve or reconstruct the hearing.

Complications of suppurative otitis media:

Now a days there is a general decline in the incidence of complications, but they are still frequently seen in our country. The reasons are poor socio economic status, lack of education and awareness about health care (middle ear discharge is still being considered merely a nuisance rather than a potentially dangerous condition), and lack of availability of trained specialists in Otorhinolaryngology in the remote rural areas where transportation facilities are scarce.

Features Indicating Complications in CSOM[11]

Table4.DAGER SIGNS FOR IMMEDIATE REFERRAL

Signs	**Type of complication**
Severe Headache	Intracranial complication
Vertigo	Labyrinthitis or meningitis
Facial nerve paralysis	Erosion of facial canal
Projected vomiting	Intracranial infection
Neck rigidity	Meningitis
Mastoid abscess	Mastoiditis

Table 5.0 TYPE OF COMPLICATIONS OF SUPPURATIVE OTITIS MEDIA[65]

Intracranial	**Intratemporal**
1. Extra dural abscess	• Facial nerve paralysis
2. Sub dural abscess	• Suppurative labyrinthitis
3. Lateral sinus thrombophlebitis	• Labyrinthine fistula
4. Meningitis	• Acute mastoiditis
5. Brain abscess	• Sub periosteal abscess
6. Otitic hydrocephalus	• Post auricular fistula
	• Petrositis

Mennigitis remains the most common complications of Suppurative otitis media.[68]In children brain abscess occurs due to other causes such as congenital heart disease have increased in relative times but remains less common than otolological infections.[69] There have been reports of large numbers of patients with otogenic complications occurred with safe type CSOM also.. .

Factors influencing development of complications:

Age:

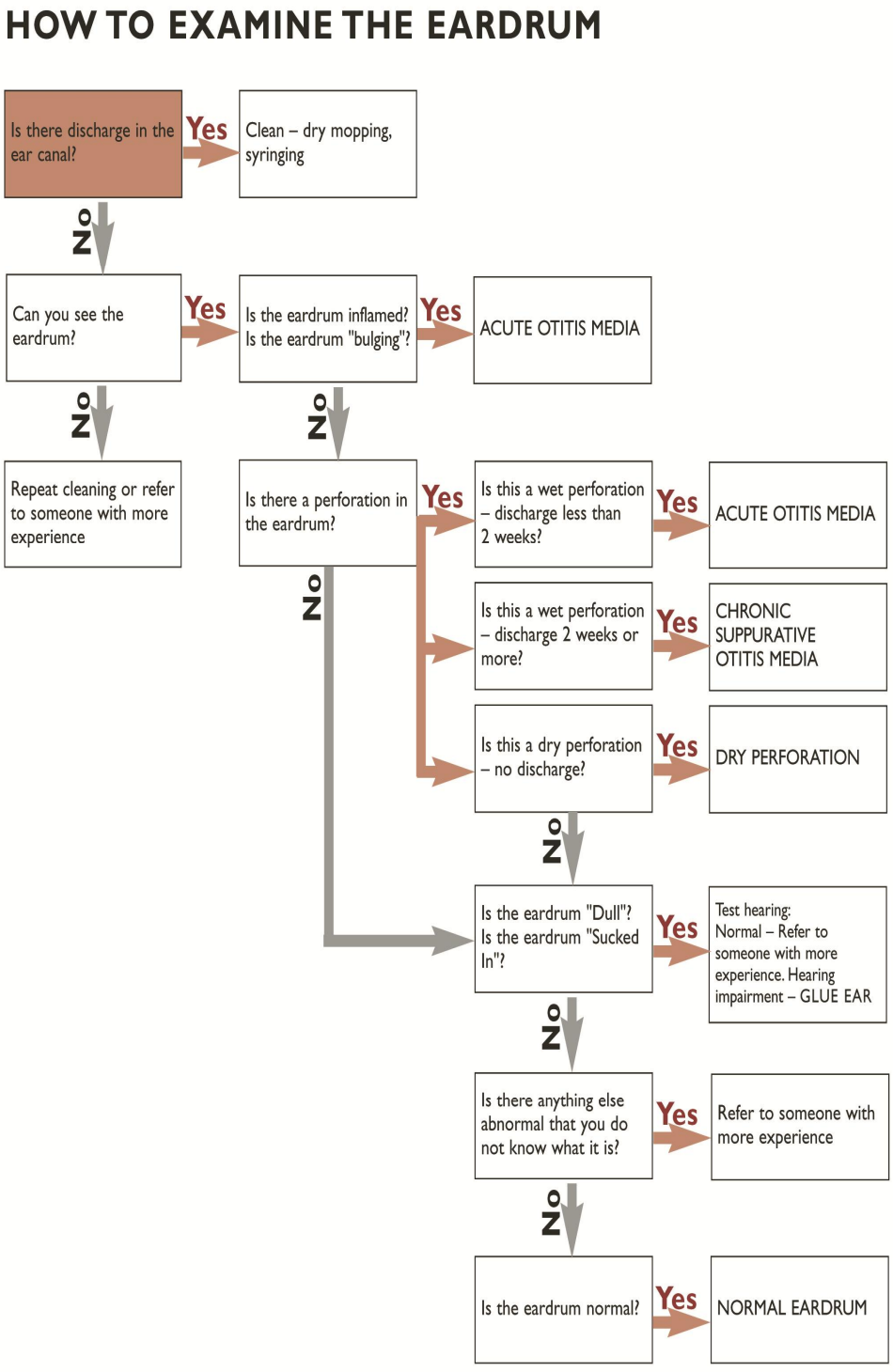
Children less than 10 years and elderly are most affected.

Poor socioeconomic group: Overcrowding, lack of health education and poor personal hygiene and poor access to health care leads to complications.

Virulence of organism:

Inappropriate use of antibiotic produces multi drug resistant organisms and leads to complications

Fig 3.0 Flowchart on diagnostic protocol :



This diagnostic algorithm is given by National Programme for Prevention and Control of Deafness to arrive at a diagnosis regarding common ear problems.[8]

4.3.7 HEARING IMPAIRMENT ASSESMENT:

World Health Organisation chart below shows levels of hearing impairment measured in two ways:

- With an audiometer which is a machine for testing hearing
- With a "voice test" which is a less accurate way of assessing hearing

Whispered voice test

- The voice test is a Screening test that means it is a way of finding out whether people have normal hearing or not. The examiner stands approximately (.6m) behind the seated student and they should whisper a combinations of letters and the numbers. 5-k-3 like this they can whisper. The child should repeat the sequence. For children 2 syllable words with equal stress on the syllables for example base ball can be whispered. The investigator should quietly exhale before whispering to ensure as quiet voice as possible. If the child responds correctly hearing is considered normal. The child is considered to have passed the screening test if the child repeat 3 out of six numbers or the letters. Each ear should be tested individually. This test is more sensitive among adults than children.[70]

Table 6 Grades of Impairment by WHO :

Grade of Impairment	Level tested with an Audiometer	Level tested with the Voice Test
Normal hearing	25 dB or better	Able to hear whispers.
Slight impairment	26 - 40 Db	Able to hear and repeat words spoken in conversational voice at 1metre.
Moderate impairment	41 - 60 dB	Able to hear and repeat words using loud voice at 1 metre.
Severe impairment	61 - 80 dB	Able to hear some words when shouted into the ear
Profound impairment (Deafness)	81 dB or greater	Unable to hear and understand even a shouted Voice.

Ref [71])

Pure tone Audiometry :

An audiometer is an electronic device which produced pure tones, the intensity of which can be increased or decreased in 5dB steps. Usually air conduction thresholds are measured for tones of 125, 250, 500,1000,2000, 4000 and 8000 Hz and bone conduction thresholds for 250, 500,1000, 2000 and 4000. The amount of intensity that has to be raised above the normal level is a measure of degree of hearing impairment at that frequency. It is charted in the form of graphs, called audiogram. The difference in thresholds of air and bone conduction is a measure of the degree of conductive deafness.

National program for prevention and control of deafness(NPPCD)

This programme was launched on a pilot project from 2006. For practical purposes this programme is decentralized and implementation of the programme is being done through the state and district health socities.

Awareness creation is an important part of the programme.

NPPCD SERVICES

Under Nppcd program the school health system will play a very important role as approximately 20% of the population is in the age group of 5to 14 yrs and children suffer from disease like Csom, Ome, etc. The school teachers should conduct a survey with a questionnaire for the primary school children to identify the symptoms of ear diseases.[35.] Those found to be required to conduct an ear checkup by the primary health care doctors. Those patients who cannot be treated in PHC, or who require investigation or surgical treatment will be referred to the district hospital. Audiological diagnosis will be carried out with the help of puretone audiometer, impedance audiometer etc. Children under the age of 14years who are identified under the program(who are in need) will be given free hearing aid and it will be fitted with the custom made mould (without batteries). Hearing and speech therapy will be provided to those who are in need in District hospitals.

INTERNATIONAL DAY FOR EAR AND HEARING

International day for Ear and hearing celebrated by WHO on 3rd March 2012 to create awareness and promotes community based activities for ear and hearing care.

METHODOLOGY AND MATERIALS

5.0 METHODOLOGY & MATERIALS

5.1 **Study design** : School based, Descriptive Cross sectional study

5.2 Study area : Government primary schools in Kancheepuram block of Kancheepuram district.

5.3 Study period : August 2012 to September 2012

5.4 Study duration : February 2012 to October 2012

5.5 Study population : Children studying from Ist standard to Vth standard in Government primary schools of Kancheepuram block, Kancheepuram dist.

5.5.1 Inclusion criteria : Children studying from Ist standard to V th standard

5.5.2 Exclusion criteria: Children of whom parents have not given consent for the study and children with cleft palate who are more prone for otitis media.

5.6 Sample size : 360

5.6.1 Sample size calculation:

Annie Jacob et al done a study in Tamilnadu, shows over all prevalence of common ear problems including wax was 51%.[37] This prevalence was taken to calculate the sample size..

Total students of the study area were 4,929 in Kancheepuram Block.

Total number of Govt. primary schools in this Block 58.(Annexure V)

Calculated sample size 360.

Sample size $N = \frac{Z\alpha^2 PQ}{L^2}$

$Z\alpha^2$ = 1.96 for 95% confidence interval

P = 51%,

Q = 100-51=49%

L = allowable error of 15% of 51 = 7.65

$N = \frac{1.96x1.96x51x49}{7.65x7.65}$

N = 164

Calculating for cluster sample, the sample size multiplied by design effect of 2 , sample size=164x2=328, with assuming 10% Of Non response the sample size =328+32=360.Each cluster = 20 children. So clusters needed to examine 360÷20 = 18. **The sample size of 360 taken for the study.**

5.7 Sampling Method:

Sampling was done in 3 stages. Kancheepuram District was divided into 13 Blocks. Among the 13 Blocks, Kancheepuram block was chosen by lottery method. Kancheepuram block has 58 government primary schools(Annexure). Total students from 58 schools were 4929. The 18 schools were chosen by cluster sampling. The

required number of children from each school was selected by simple random technique.

Table 7.0 List of 18 selected schools by cluster sampling :-

S.NO	Name of the School
1	Puteri Primary School
2	Sevilimedu Primary School
3	Thirupparuthikkunram Primary School
4	Damal Colony Primary School
5	Thiruppukkuzhi Primary School
6	Vishar Primary School
7	Vedal Primary School
8	Arppakkam Primary School
9	Kannadian Kudisai Primary School
10	Konerik Kuppam Primary School
11	Ayyangar Kulam Primary School
12	Thirukkalimedu Primary School
13	Periyanatham Primary School
14	C.S.M Primary School
15	Kailasanathar Primary School
16	Thumbavanam Primary School
17	Reddip Pettai Primary School
18	Asur Primary School

5.7.1 Method of choosing clusters:

1. With the cluster size of 20, no of clusters (schools) needed 18

2. The population of each school varies from a minimum of 17 to a maximum of 321. As the size of each cluster is 20, the schools with a population < 20 will be clubbed with the adjacent school to obtain the required number of 20.

3. Cumulative population of the schools were calculated.

4. Cluster interval = total population/ required no of clusters. i.e. = 4929 ÷18 = 274

5. One number randomly chosen From 1 to 274 taken as 1st cluster (school) and subsequent clusters were selected by adding cluster interval to the first cluster and so on till the required no of clusters are obtained. By this method, 18 schools were selected.

6. From the selected schools (clusters) the required numbers of 20 students are selected randomly. The school sampling frame of all children from standard 1st to 5th standard obtained. From the sampling frame the required 20 students selected through a simple random technique.

5.8 STUDY TOOLS

I. Semi Structured Questionnaire

II. Otoscope

III. Pure tone Audiometry

5.8.1 Semi Structured Questionnaire:

The study was done using a pre-tested and semi structured questionnaire. WHO questionnaire used for ear and hearing disorders was modified and used. The questionnaire in English has been translated to Tamil and retranslated into English to check for correction of translation(Annexure II). Then the questionnaire was pretested among the students and necessary changes were made. The results of the pilot study were not included in the analysis.

Questionnaire contains

History

1. Socio demographic details like Name of the child, age, sex, address, parent's education ,occupation, consanguineous marriage, total income of the family, members of the family, type of the house and No. of rooms in the house were asked.
2. History regarding predisposing factors for ear problems like, personal hygiene, family history of ear problems and hearing impairment, recurrent respiratory infections, snoring(due to adenoid hypertrophy), passive smoking (smoking habit of parents , caretakers), material used for cooking (household smoke) were elicited.
3. History regarding symptoms of ear problems like ear pain, ear discharge, duration of discharge, block sensation in the ear, itching in the ear, and response to calls (to rule out hearing impairment) were recorded.

5.8.2 Examination

1.**Personal hygiene** examination included dental caries, nasal discharge, cleanliness of hair, dress, and use of footwear.

2.**Ear examination**:

a. Visual inspection of external ear, auditory canal

b.Otoscope examination of middle ear;.

Heine mini Pneumatic otoscope with Seigle's speculum was used for ear examination. The presence or absence of otorrhea,, perforation of ear drum, granulation tissue in middle ear, impacted wax and otomycosis were determined. The tympanic membrane was considered normal when both its appearance and mobility was normal.

1. Whisper hearing test – to find out hearing impairment

2. Audiogram – Pure Tone Audiometry.

To confirm the hearing impairment in those positive for whisper test. The hearing of the child was tested by audiologist with a battery driven field audiometer (pure tone audiometry with sound attenuating headphones). Air conduction and bone conduction were tested for the following frequencies: 0.5 KHz, 1 KHz, 2 KHz, upto, 4 KHz, Based on WHO guidelines, hearing impairment categorized to mild (26-40dB loss), moderate(41-60 dB loss) and severe(61-80dB loss), profound (>81dB loss)

5.9. DATA COLLECTION:

Initially permission to conduct the study was obtained from the Director, Institute of Community Medicine,Madras Medicals college and The Dean, Madras Medical College. Then approval was obtained from Institutional Ethical Committee, Madras Medical college. After that, permission was obtained from District Educational officer and Headmaster/ Headmistress of the selected schools. The investigator had been trained at Institute of Otorhinolaryngology, Madras Medical College, to acumen with ear examination skills.

Information was given to the selected schools 1 week before the day of survey to ensure maximum attendance of the students. The teachers were briefed about the activities to be undertaken.

The complete address of each child was obtained from the school records.

The informed consent was obtained from the parents by the following way:

1. The parents who came to receive their children after the school hours, was gathered in a class room with the help of the school teachers.
2. The parents who could not be contacted in the schools were approached by home visits to get informed consent after a brief introduction of the study.
3. The working parents were contacted at their homes during the morning hours to get informed consent.

The selected students, for whom consent was obtained, were included in the study.

Randomly selected students were examined for personal hygiene and ear disorders. External ear examination was done by inspection. Then, Otoscope examination was done to identify different pathology of ear diseases.

WHISPER TEST AND AUDIOGRAM

Test Environment:

Testing was performed in a selected class room and the students in that class was vacated by the class teacher prior to commencement of the test. During the test period windows and doors were closed as there was no provision for sound proof room. School activities continued as usual in the adjacent class rooms. Staff and students were briefed about the nature of the survey and need for the quiet environment which was observed as far as possible.

To identify hearing impairment, whisper voice test was done for all randomly selected students. Those who were found abnormal in the whisper test were subjected to audiogram. Audiometry was done by audiologist.

After the examination of the child, the data (questionnaire containing socio demographic details like educational status, overcrowding, passive smoking and any ear symptoms of the child) was obtained from the parents or available family members at the time of house visit by the investigator using a structured questionnaire. The interview was conducted at their residence.

5.10 SERVICES PROVIDED

Children who had impacted wax and otomycosis were treated by removing wax and fungus under good head light using Jobson's probe. Children with very hard impacted wax were referred to Kancheepuram Government Hospital ENT Department. Children with Acute otitis media and otitis externa were prescribed anti inflammatory drugs and appropriate antibiotics. Dry mopping done for Children with Chronic otitis media with discharge , and referred to Kancheepuram Government Hospital ENT Department for further treatment. Children with otitis media with effusion were prescribed anti histamines and anti inflammatory drugs. The teachers were sensitized regarding the follow up of the affected children whether they have attended hospital. During home visit, the investigator explained about the condition of the child to the parents . They were also given health education , that they should not clean the children's ear with any objects like hair pin, safety pin, ear buds, feather, etc. if the child has CSOM, care must be taken that water does not enter through the perforated ear which increases the infection. They should be advised not to take bath in ponds, rivers, wells etc. it was emphasised that the diseased children should have a regular follow up at ENT department, Kanchipuram district headquarters hospital,Kachipuram.. Any Child with recurrent respiratory infection, ear pain and throat pain should consult the nearby Registered Medical Practioner for medical advice.

5.11 DATA ENTRY AND ANALYSIS

Data was entered in Microsoft Office Excel 2007. Analysis was carried out using Statistical Package for Social Sciences (SPSS for Windows Version 16.0).

Relevant prevalences were calculated and tabulated. Cross tabulations were done to process the factors associated with ear problems. Chi square test was used to analyse the variables. A P value <0.05 was considered to be statistically significant. Following variables were considered (class, parent's education, overcrowding, socio economic status, recurrent respiratory tract infections, snoring (adenoid hypertrophy), allergy, passive smoking and household smoke).

5.12 OPERATIONAL DEFINITIONS:

5.12.1 Impacted wax:

It was considered impacted wax when the it covers the whole of the external auditory canal and the tympanic membrane is not visible at all.[24]

5.12.2 Otitis externa:

Infection of the external auditory canal associated with swelling, pain and discharge.[72]

5.12.3 Otomycosis:

Examination with the otoscope shows fungal mass which appears white, brown, and black in colour.[60]

5.12.4 Acute otitis media:[24]

AOM diagnosed with history of fever, ear pain, with or without discharge from Ear less than 2 weeks duration, and examination with otoscope shows intense red colour or bulging Tympanic memberane with or without hearing loss.

5.12.5 Otitis media with effusion (OME):[24]

On examination with otoscope if there is change in colour (pinkish) visible retraction and there is limited mobility of the Tympanic membrane (tested with siegle's speculum)

5.12.6 Chronic suppurative otitis media:

History of ear discharge more than 2 weeks from a perforation of tympanic membrane (safe type),and or with cholesteatoma on (unsafe type) otoscopic examination.

5.12.7 Recurrent respiratory tract infection[59]

If the child suffered from more than 3attacks of respiratory tract infections with in 6 months considered as recurrent respiratory tract infection.

5.12.8 Passive smoking [9]

If any one of the family member(parent or care taker) in the house having the habit of smoking in the presence of the child.

5.12.9 Over crowding criteria[71]

The degree of over crowding expressed as the number of persons per room. The accepted standars are1room-2persons, 2rooms-3persons, 3rooms-5persons, 4rooms- 7 persons,5rooms-10 persons. If more than this standard is called as overcrowding**.**

5.12.10 Allergic rhinitis [9]

Children with a history of sneezing,wateing from eyes, nasal block or nasal discharge when exposed to allergens like dust or smoke were diagnosed as allergic rhinitis.

RESULTS

6.0 RESULTS

The required sample size for the study was 360.

Background characteristics

Table 8 : Background Characteristics

CHARACTERISTIC	NUMBER (N = 360)	PERCENTAGE(%)
AGE(IN YEARS)		
6 years	87	24.1
7 years	76	21.1
8 years	67	18.6
9 years	65	18.1
10 years	65	18.1
SEX		
Males	178	49.4
Females	182	50.6
RELIGION		
Hindu	354	98.3
Muslim	2	0.6
Christian	4	1.1
FATHERS EDUCATION		
Illiterate	71	19.7
1-5	134	37.2
6-12	152	42.2
Degree	3	0.8
MOTHER'S EDUCATION		
Illiterate	64	17.8
1-5	158	43.9
6-12	138	38.3

CHARACTERISTIC	NUMBER (N = 360)	PERCENTAGE(%)
FATHER'S OCCUPATION		
Not working	3	0.8
Unskilled	299	83.1
Semiskilled	1	0.3
Skilled manual	47	13.1
Skilled non manual	10	2.8
MOTHER'S OCCUPATION		
Not working	82	22.8
Unskilled	272	75.6
Skilled manual	6	1.7
SOCIOECONOMIC STATUS		
Class1	2	0.6
Class2	38	10.6
Class3	152	42.2
Class4	137	38.1
Class5	31	8.6
TYPE OF HOUSE		
Kutcha	81	22.5
Semi-pucca	177	49.2
Pucca	102	28.3
RESPONDANTS		
Mother	289	80.3
Father	55	15.3
Others	16	4.4

In total 360 students participated in the study. Majority of the students belonged to the age 6 years (24.2%), followed by 7 years (21.1%) and the remaining

54% was equally shared by 8,9 and 10 years. The male and female children were almost equally distributed with 49.4% male children and 50.6% female children.

Among 360 participants, for 289(80.3%) mothers were the respondants, 55(15.3%) fathers and the rest 16(4. 4%) were responded by others.

Among the participants, 98.3% were Hindus ,1.1% were Christians and 0.6% were Muslims. Educational status of the parents were as follows :19.7% of the fathers were illiterate, 37.2% had completed 1 to 5 years (Primary School) of formal education, 42.2% had completed 6 to 12 years (Higher Secondary School) of education and 0.8% had completed college education. Among mothers, 17.8% were illiterate, 43.9% had completed 1 to 5^{th} standard(Primary School) of formal education and 38.3% had completed 6 to 12^{th} standard (Higher Secondary School) of education.

Occupational status of the parents: 0.8% of the fathers were not working, 83.1% were unskilled labourers ,0.3% skilled labourers ,13.1% were doing skilled manual work and 2.8% were skilled non manual workers.

Among the mothers of the participants, 22.8% were not working, 75.6% were unskilled workers and 1.7% were doing skilled manual works.

Socioeconomic status was classified from monthly per capita income based on Modified B. G. Prasad scale for rural area.(Annexure III) According to this classification, 2 (0.6%) participants belonged to Class I, 38(10.6%) participants belonged to Class II, 152participants (42.2%) belonged to Class III, 137 (38.1%) participants to Class IV and 31(8.6%) participants to Class V.

83(22.5%) participants lived in kutcha house,177 (49.2%) lived in semi-pucca houses and 102(28.3%) in pucca houses.

Figure 4: Prevalence of ear problems

Among the 360 students 176(48.9%) students are having ear problems.184 (51.1%) students are not having any ear problems.

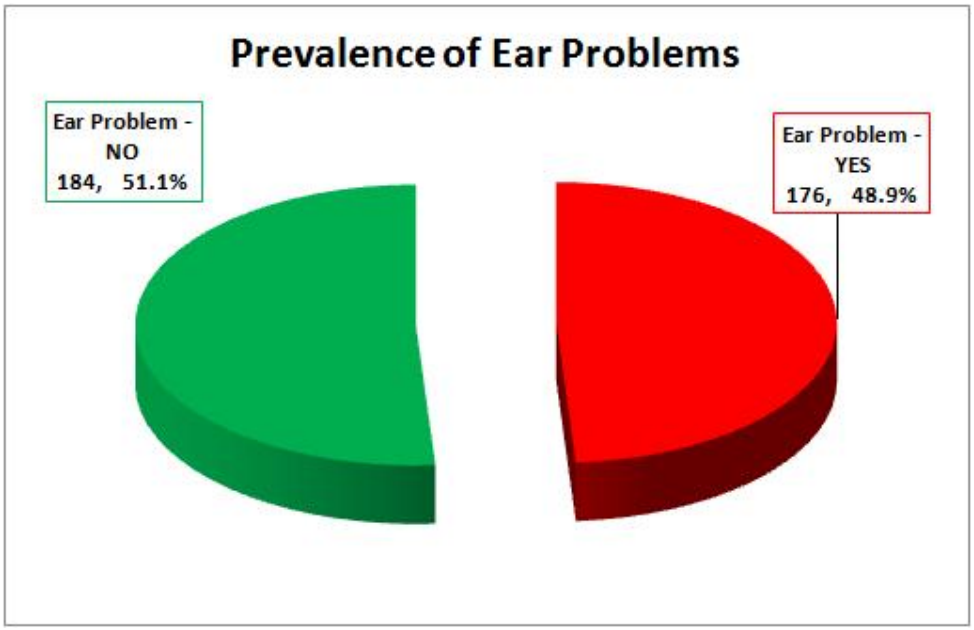
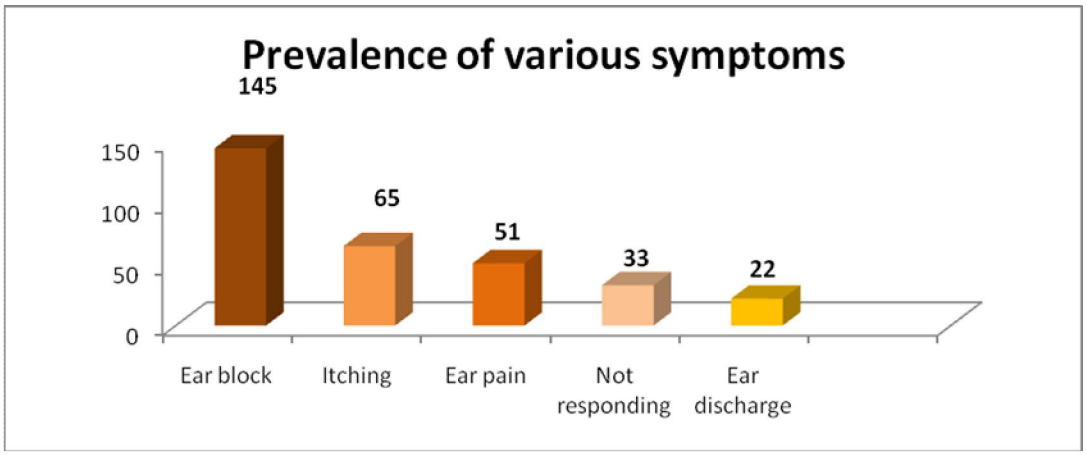
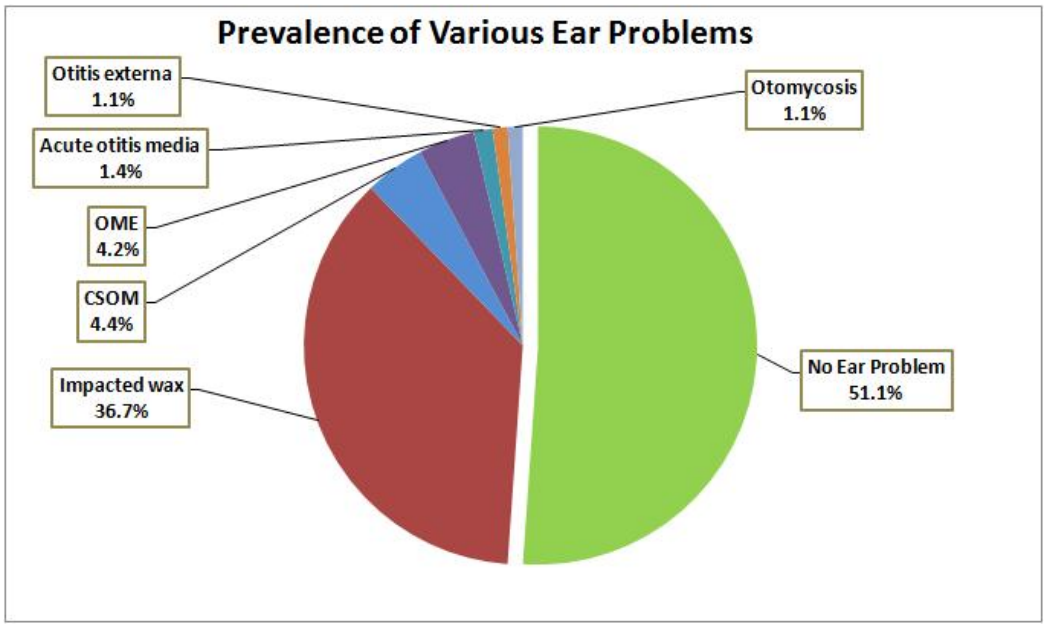


Figure 5: Prevalence of various symptoms 0f ear problems



Among the total of 360 students, Ear block was the commonest symptom reported 145(45.9%,) (95% C.I. 29.7 % - 53.8%), followed by itching 65(18.1 %), (95% C.I. 8.3 % - 19.4%), ear pain 51(14.2%),(95% C.I. 7.6 % - 32.4%),not responding to calls33(9.2%),(95% C.I. 4% - 12.2%) and ear discharge22(6.1%), (95% C.I. 1.9% - 21.3%).63 (17.5%) students reported only one symptom of ear problem. 57(15.8%) reported 2 symptoms , 23(6.4%) reported 3 symptoms,8 (2.2%) reported 4 symptoms and 8(2.2%) reported 5 symptoms.

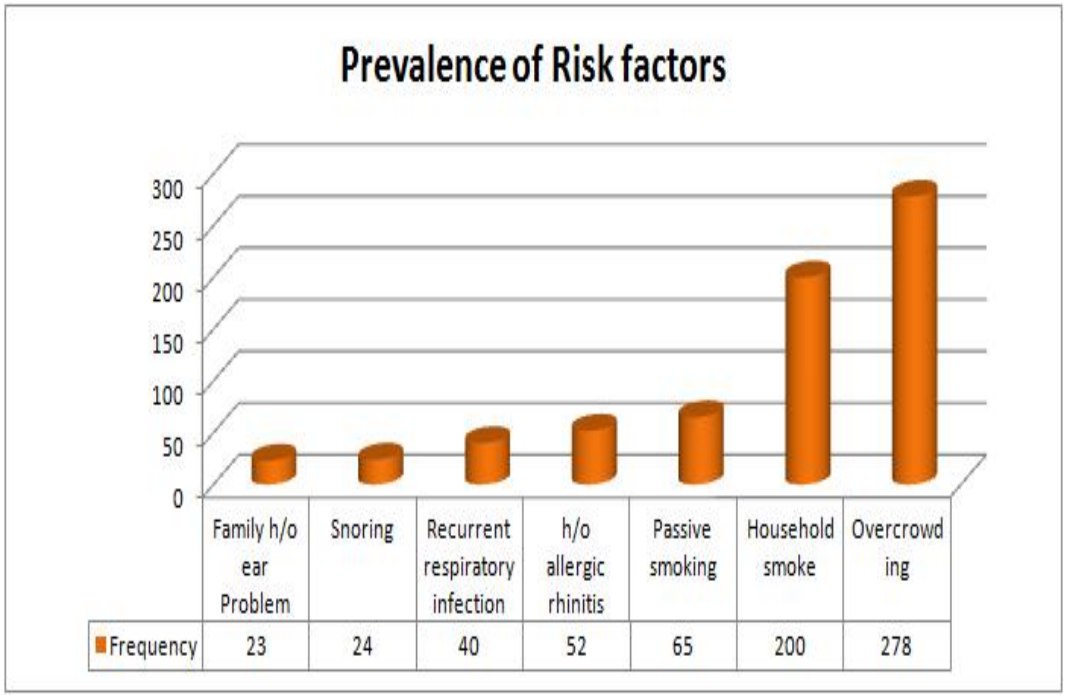
Fig 6 : PREVALENCE OF VARIOUS EAR PROBLEMS:



Among various ear problems, in this study impacted wax was the common ear problem with a prevalence of 36.7%,(95% C.I. 32.4 % - 41.9 %) followed by Chronic Suppurative Otitis Media(CSOM) 4.4%(95% C.I. 0.9 % - 24.2%),Otitis media with effusion 4.2%, (95% C.I. 1.1 % - 20.3%) Acute otitis media 1.4%,(95% C.I. 0.3 % - 2.6%)otitis externa 1.1% (95% C.I. 0.2% - 2.2%)and otomycosis 1.1%(95% C.I. 0s.2% - 2.2%).

PREVALENCE OF RISK FACTORS:

Fig 7 Prevalence of risk factors



Among the 360 , 40 (11.1%) students recurrent respiratory tract infections, 23(6.7%) students had a positive history of snoring and 52(14.4%) had symptoms of frequent cough and sneeze when exposed to pollen grains. 23(6.4%) of the students had a family history of ear problems. 278(77.2%) of the students habitats were overcrowded.65 students(18.1%) had an exposure to smoke since any of the family members smoked. 200 (56.3%) children had exposure to household smoke(wood is used as cooking fuel).

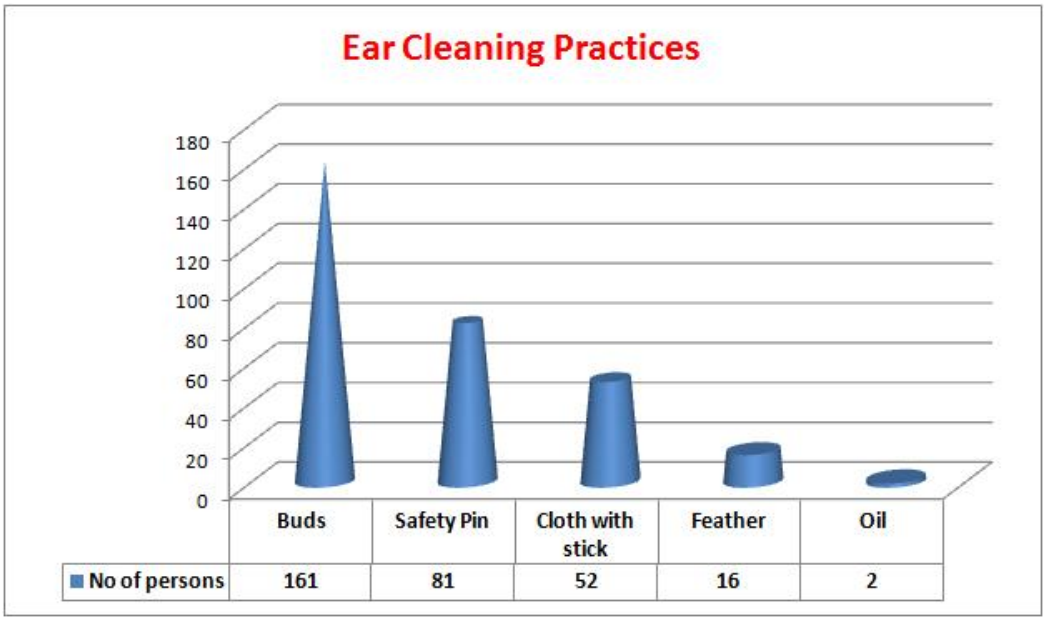
Table 9 PERSONAL HYGIENE PRACTICES DISTRIBUTION

Unclean hair	87	24.2
Unclean nails	186	51.7
Nasal discharge	85	23.6
Dental caries	207	57.5
Bare foot	207	57.5
Dress unclean	92	25.6

Among 360 students, 87 (24.2%) of them had unclean hair.186 students (51.7%) did not cut their nails or their nails were dirty. 85students (23.6%) had nasal discharge at the time of examination. 207 students (57.5%) had dental caries and were bare foot.

EAR CLEANING PRACTICES

Fig 8: Ear cleaning practices



Among the 360 students, 312 (87.9%) had a habit of cleaning ear. Out of these 312 students , 132 (42.3%) cleaned once in a week, 69(22.1%) reported once in 2 weeks, 108 (34.6%) reported once in 2 months . Buds were commonly used for cleaning ears 161 (51.6%), followed by safety pin 81(25.9%),cloth with stick 52(16.7), feather16(5.1%), and oil 2(.64%).

STATISTICAL ANALYSIS OF VARIABLES:

Table 10: CROSS TABULATION BETWEEN AGE AND EAR PROBLEMS:

AGE	EAR PROBLEMS	NO EAR PROBLEMS	95%C.I.		TOTAL
			Lower(%)	Upper(%)	
6	50(57.5%)	37(42.5%)	27.9	59.3	87
7	43(56.6%)	33(43.4%)	33.5	60.6	76
8	29(43.3%)	38(56.7%)	38.3	74.5	67
9	29(44.6%)	36(55.4%)	36.5	71.6	65
10	23(35.4%)	42(64.6%)	33.5	79.1	65

Chi square = 10.387, p= 0.034(S), df = 4

Among the study participants, the prevalence of ear problems was found to be more common among students of 6 years age group, followed by 7 years age group. The study also found that as age increases the prevalence of ear problems decreased. The difference was found to be significant.

Table 11 : CROSS TAB BETWEEN SEX AND EAR PROBLEMS

SEX	EAR PROBLEMS	NO EAR PROBLEMS	95% C.I.		TOTAL
			Lower (%)	Upper (%)	
Male	90(50.6%)	88(49.4%)	35.5	67.2	178
Female	84(46.2%)	98(53.8%)	39.2	62.6	182

Chi square 0.700, p = 0.403(NS), df = 1

Among the students, the ear problems was sli]ghtly higher among male children than female children, which was statistically not significant.

Table 12 CROSS TAB BETWEEN FATHER'S EDUCATION AND EAR PROBLEMS:

FATHER'S EDUCATION	EAR PROBLEMS	NO EAR PROBLEMS	TOTAL
< 6^{th} standard	108(52.7%)	97(47.3%)	205
> 6^{th} standard	66(42.6%)	89(57.4%)	155

Chi square 3.607, df=1 p value = 0.058(NS)

The prevalence of ear problems was higher among students whose father's education was less than 6^{th} standard. The difference was statistically not significant.

Table 13 : CROSS TAB BETWEEN MOTHER'S EDUCATION OF EAR PROBLEMS

MOTHER'S EDUCATION	EAR PROBLEMS	NO EAR PROBLEMS	TOTAL
< 6^{th} standard	143(65.9%)	74(34.1%)	217
≥6^{th} standard	31(21.7%)	112(78.3%)	143

Chi square 67.496, df=1, p value =0.000(SS)

The prevalence of ear problem was higher among students whose mother's had less than high school education. This was statistically significant.

TABLE 14 : CROSS TAB BETWEEN SOCIOECONOMIC STATUS AND EAR PROBLEMS:

SOCIOECONOMIC CLASS	EAR PROBLEMS	NO EAR PROBLEMS	TOTAL
Class I	0(0%)	2(100%)	2
Class II	1(2.6%)	37(97.4%)	38
Class III	48(31.6%)	104(68.4%)	152
Class IV	96(70.1%)	41(29.9%)	137
Class V	29(93.5%)	2 (6.5%)	31

Fisher's Exact test = 116.520 p value = 0.000(SS)

The prevalence of ear problems was highest (93.5%) among students who belong to class V(lower) socio economic class. This association was found to be statistically significant. As socio economic class decreases the prevalence of ear problems increases. Classification was based on Modified P.G. Prasad Socioeconomic scale.(Annexure III).

TABLE 15: CROSS TAB BETWEEN TYPE OF HOUSES AND EAR PROBLEMS:

TYPE OF HOUSE	EAR PROBLEMS	NO EAR PROBLEMS	TOTAL
Kutcha	68(84%)	13(16%)	81
Semi pucca	82(46.3%)	95(53.7%)	177
Pucca	24(23.5%)	78(76.5%)	102

Chi square = 66.563, df=2, p value = 0.000(SS)

The students who lived in kutcha houses had a higher prevalence of ear problems followed by semi pucca houses which was found to be statistically significant.

TABLE 16 : CROSS TAB BETWEEN CONSANGUINEOUS MARRIAGE AND EAR PROBLEMS

H/O CONSANGUINEOUS MARRIAGE	EAR PROBLEMS	NO EAR PROBLEMS	TOTAL
Yes	38(61.3%)	24(38.7%)	62
No	136(45.6%)	162(54.4%)	298

Chi square =5.035, p value = 0.025(ss),df=1

The prevalence of ear probems was found to be higher among students who were born out of consanguineous marriage(61.3%) as compared to non consanguineous marriage. This was found to be statistically significant.

TABLE 17 :CROSS TAB BETWEEN OVERCROWDING AND EAR PROBLEMS:

OVERCROWDING	EAR PROBLEMS	NO EAR PROBLEMS	TOTAL
Present	161(57.9%)	117(42.%)	278
Absent	13(15.9%)	69(84.1.3%)	82

Chi square = 44.858,, p value = 0.000(SS),df=1

The association between overcrowding and ear problem was found to be statistically significant.

TABLE 18: CROSS TAB BETWEEN PERSONAL HYGEINE AND EAR PROBLEMS

Personal Hygiene and Ear Problems :

Personal Habits	Yes / No	Ear Problem	No Ear Problem	P value
Daily Bathing	Yes	98 (35.9 %)	175 (64.1%)	0.000
	No	76 (87.4%)	11 (12.6 %)	
Hair clean	Yes	111 (40.7%)	162 (59.3%)	0.000
	No	63 (72.4%)	24 (27.6%)	
Nasal discharge	Yes	71 (83.5%)	14 (16.5%)	< 0.05
	No	103 (37.5%)	172 (62.5%)	
Dress clean	Yes	99 (36.9%)	169 (63.1%)	< 0.05
	No	75 (81.5%)	17 (18.5%)	
Bare foot	Yes	129 (62.3%)	78 (37.7%)	< 0.05
	No	45 (29.4%)	108 (70.6%)	
Dental caries	Yes	127 (61.4%)	80 (38.6%)	< 0.05
	No	47 (30.7%)	106 (69.3%)	

Among students who did not have a habit of bathing daily had a higher prevalence of ear problems than the students who took bath daily. This association was found to be statistically significant. Poor hair hygiene was found to be associated with ear problem which was statistically significant. A significant association was found between nasal discharge and ear problem. The students who did not wear clean dresses had a increased prevalence of ear problems. Among the students who were walking bare foot had a high prevalence of ear problems which was statistically significant. Dental caries was found to be significantly associated with ear problems.

TABLE 19 : CROSS TAB BETWEEN HABIT OF CLEANING EAR AND EAR PROBLEMS:

HABIT OF CLEANING EAR	EAR PROBLEMS	NO EAR PROBLEMS	TOTAL
Yes	148(47.4%)	164(52.6%)	312
No	24(58.5%)	22(45.8%)	48

Chi square = 1.755,pvalue = 0.182(NS),df=1

There was no association between habit of cleaning ears and ear problems.

TABLE 20: CROSS TAB BETWEEN FREQUENCY OF CLEANING EAR AND EAR PROBLEMS

FREQUENCY OF CLEANING EAR	EAR PROBLEMS	NO EAR PROBLEMS	TOTAL
Once in a week	57(42.9%)	76(57.1%)	133
Once in 2 weeks	35(50%)	35(50%)	70
Once in a month	54(50%)	50(50%)	100
Others	3(100%)	0(0%)	3

Fisher's Exact test = 4.520, p value = 0.194(NS)

There was no association between frequency of cleaning ears and ear problems.

TABLE 21: CROSS TAB BETWEEN MATERIAL USED TO CLEAN EARS AND EAR PROBLEMS

TYPE OF MATERIAL	EAR PROBLEMS	NO EAR PROBLEMS	TOTAL
Buds	69(42.9%)	92(57.1%)	161
Feather	7(43.8%)	9(56.2%)	16
Cloth with stick	26(50%)	26(50%)	52
Oil	1(50%)	1(50%)	2
Safety pin	45(55.6%)	36(44.4%)	81
Others	1(50%)	1(50%)	2

Fisher's Exact Test = 4.233, p value = 0.528(NS)

There was no association between material used to clean ears and ear problems.

TABLE 22: CROSS TAB BETWEEN FAMILY MEMBERS

SUFFERINGFROM EAR PROBLEMS AND EAR PROBLEMS

FAMILY H/O EAR PROBLEMS	EAR PROBLEMS	NO EAR PROBLEMS	TOTAL
Yes	17(73.9%)	6(26.1%)	23
No	157(46.6%)	180(53.40)	337

Chi square = 6.438, p value = 0.011(S),df=1

The students with a positive family h/o ear problems had a higher prevalence of ear problems when compared to those students with a negative family h/o ear problems. The difference was statistically significant.

TABLE 23 : CROSS TAB BETWEEN SNORING AND EAR PROBLEM

SNORING	EAR PROBLEMS	NO EAR PROBLEMS	TOTAL
Yes	22(91.7%)	2(8.3%)	24
No	152(45.2%)	184(54.8%)	336

Fisher's exact test = 22.115, p value = 0.000(SS),df=1

Among the students who had snoring , the ear problems prevalence was also high. this was statistically significant.

TABLE 24: CROSS TAB BETWEEN RECURRENT RESPIRATORY TRACT INFECTIONS AND EAR PROBLEMS

NO OF URI ATTACKS	EAR PROBLEMS	NO EAR PROBLEMS	TOTAL
0	28(27.2%)	75(72.8%)	103
1-3 attacks	109(50.2%)	108(49.8%)	217
>3 attacks	37(92.5%)	3(7.5%)	40

Fisher's exact test =54.557, p value = 0.000(SS), df=2

The students with > 3 attacks of URI within 6 months had a higher prevalence of ear problems, followed by 1- 3 attacks, which was found to be statistically significant.

TABLE 25: CROSS TAB BETWEEN H/O ALLERGIC RHINITIS AND EAR PROBLEM

H/O ALLERGY	EAR PROBLEMS	NO EAR PROBLEMS	TOTAL
Yes	44(84.6%)	8(15.4%)	52
No	130(42.2%)	178(57.8%)	308

Chi square = 32.039, p value = 0.000(SS), df=1

The association between allergic rhinitis and ear problems was found to be statistically significant.

TABLE 26: CROSS TAB BETWEEN FAMILY MEMBER SMOKING AND EAR PROBLEM

FAMILY MEMBER SMOKING	EAR PROBLEM	NO EAR PROBLEM	TOTAL
Yes	40(61.5%)	25(38.5%)	65
No	13445.4%)	161(54.6%)	295

Chi square = 5.539, df=1, p value = 0.019(S)

There was an association between passive smoking and ear problems. The difference was found to be statistically significant.

TABLE 27: CROSS TAB BETWEEN EXPOSURE TO WOOD SMOKE AND EAR PROBLEMS

MATERIAL USED FOR COOKING	EAR PROBLEM	NO EAR PROBLEM	TOTAL
Gas	68(43%)	90(57%)	158
Wood	106(52.5%)	96(47.5%)	202

Chi square = 3.331 df=1, p value = 0.068(NS)

Among the students, whose family were using wood for cooking purpose had a high prevalence of ear problem than those who used gas for cooking. This was not statistically significant.

OTITIS MEDIA AND RISK FACTORS

TABLE 28: CROSS TAB BETWEEN OTITIS MEDIA AND SNORING

SNORING	OTITIS MEDIA		TOTAL
	YES	NO	
Yes	20(83.3%)	4(16.7%)	24
No	16(4.8 %)	320(95.2%)	336

Fisher's exact test = 83.782, p value – 0.000

Among the students who were snoring, 83.3% had otitis media as compared to students who did not snore(4.8%) which was found to be statistically significant. **AOM, CSOM and OME** these 3 problems grouped into Otitis media.

TABLE 29: CROSS TAB BETWEEN OTITIS MEDIA AND RECURRENT RESPIRATORY TRACT INFECTIONS

Recurrent ARI	Otitis Media		Total
	Yes	No	
0 attacks	0 (0%)	103 (100%)	103
1 - 3 attacks	9 (4.1%)	208 (95.9%)	217
> 3 attacks	27 (67.5%)	13 (32.5%)	40

Fisher's exact test =104.742, d.F = 2, p value – 0.000

The students who had frequent attacks of URI as high as > 3 per 6 months, the prevalence of otitis media was found to be high. The difference was statistically significant.

TABLE 30: CROSS TAB BETWEEN OTITIS MEDIA AND PASSIVE SMOKING

Passive smoking	Otitis Media		Total
	Yes	No	
Yes	18 (27.7%)	47 (72.3%)	65
No	18 (6.1%)	277 (93.9%)	295

Chi square value = 26.899, d.f = 1, p value – 0.000(SS)

There was a positive association between passive smoking and otitis media, which was statistically significant**.**

TABLE 31: CROSS TAB BETWEEN OTITIS MEDIA AND EXPOSURE TO WOOD SMOKE

Material used as fuel for cooking	Otitis Media		Total
	Yes	No	
Gas	8 (5.2%)	150 (94.9)	158
Wood	28 (13.9%)	174 (86.1%)	202

Chi square = 7.709, d.f= 1, p value – 0.005(SS)

Wood usage for cooking was found to have increased prevalence of otitis media.

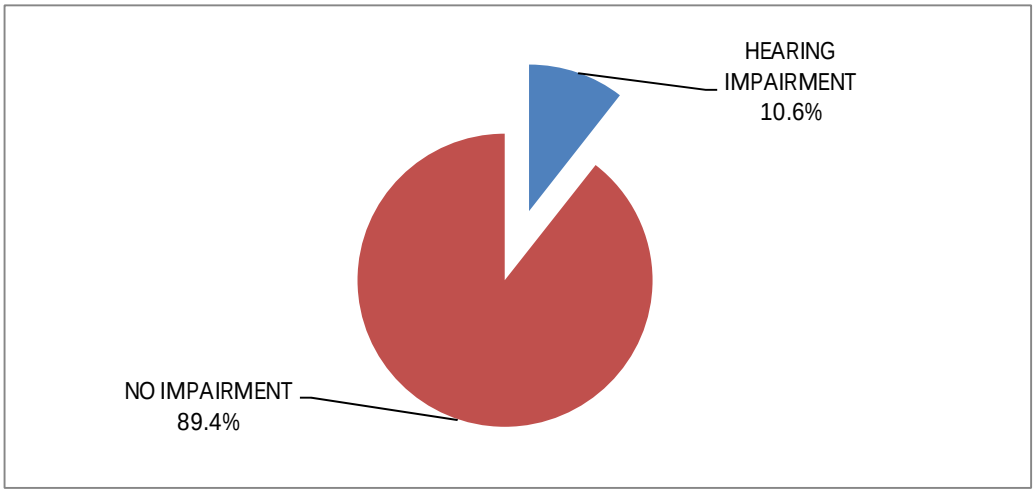
TABLE 32: CROSS TAB BETWEEN OTITIS MEDIA AND ALLERGIC RHINITIS

Allergy	Otitis Media		Total
	Yes	No	
Yes	28 (53.8%)	24 (46.2%)	52
No	8 (2.6%)	300 (97.4%)	308

Chi square =129.8, d.F= 1, p=0.000.

There was a positive association between allergy and otitis media which was found to be statistically significant.

FIG 9: PREVALENCE OF HEARING IMPAIRMENT BY AUDIOMETRY



Among 360 students, 57 (15.8%) students showed hearing impairment in whisper test. When they were subjected to audiogram, only 38(10.6%) students showed hearing impairment. Among the 38 students, 29(76.3%) of them had mild hearing impairment,9 (23.6%) had moderate hearing impairment and none had severe hearing impairment. All the students had conductive deafness and none had sensor neural hearing loss.

TABLE 33: PREVALENCE OF HEARING IMPAIRMENT IN VARIOUS EAR PROBLEMS

Ear problems	Number of patients	Hearing impairment(no.)	%	P value
WAX	132	13	9.8	0.740
CSOM	16	15	93.8	0.000
OME	15	11	73.3	0.000
AOM	5	0	0	0.439
OTOMYCOSIS	4	1	25	0.344
OTITISEXTERNA	4	0	0	0.490

Among the 132 students who had wax, 13 (9.8%) had hearing impairment. Out of the 16 with CSOM, 15 (93.8%) had hearing impairment. 11(73.3%) students of the 15 diagnosed to have OME had hearing impairment. Only one student(25%) out of the 4 otomycotic patients had hearing impairment. The children with AOM and otitis externa did not show any hearing impairment.

TABLE 34: MULTIPLE LOGISTICS REGRESSION FOR FACTORS WITH EAR PROBLEMS

Factors		Beta	S.E. (Beta)	P-Value	Adj OR	95% C.I.for EXP(B)	
						Lower	Upper
mothers_education	6-12*						
	1-5	2.288	.455	.000	9.852	3.957	24.528
	illiterate	1.099	.331	.001	3.002	1.565	5.758
Socioeconomic status	Class I*						
	Class III	1.817	.796	.024	6.152	1.291	29.326
	Class IV	2.871	.799	.000	17.650	3.685	84.529
type_of_house	Pucca*						
	kutcha	1.624	.432	.000	5.073	2.166	11.877
	semi pucca	0.832	.360	.023	2.297	1.133	4.657
overcrowding	Normal*						
	overcrowding	0.992	.431	.022	2.696	1.156	6.286
ALLREGIC RHINITIS	no						
	yes	1.317	.464	.004	3.734	1.499	9.307

The variables which were significantly associated with the ear problems were included in the logistic regression model.

Factors causing ear problems after adjusting all other factors are mother's education, socio economic class, type of house, over crowding and allergic rhinitis.

The children of the mothers who were completed primary schooling or illiterate were at higher odds (9.852 and 3.002 respectively) of developing ear

problem compared to the children of mothers who were educated above Vth standard. These odds were significant. The children belonging to lower socioeconomic class III , class IV had significantly higher odds(6.152,17.650, respectively) of developing ear problem compare to children of higher socioeconomic class I. The children who are living in kutcha and semi pucca houses are having significantly higher odds(5.073,2.297 respectively) of developing ear problem compared to those children who are residing in pucca houses. children who are living in overcrowding houses are having significantly higher odds(2.696) of developing ear problems compare to children of who are not living in over crowding houses. The children who are suffering from allergic rhinitis having significant higher odds (3.734) of developing ear problems. These odds were significant.

TABLE 35: Multiple Logistic Regression Analysis for Otitis Media

Factors		Beta	S.E. (Beta)	P-Value	Adj OR	95% C.I.for EXP(B)	
						Lower	Upper
suffer_sneeze_exposed_polle(Allergic rhinitis)	No						
	Yes	4.086	.567	.000	59.474	19.584	180.615
family_member_smoke	No						
	Yes	1.718	.553	.002	5.576	1.887	16.473
material_use_for_cooking (Exposure to wood smoke)	Gas						
	Wood	1.062	.597	.075	2.893	.898	9.316

Factors causing otitis media (AOM,SOM,CSOM,) after adjusting all other factors are allergic rhinitis, passive smoking and exposed to wood smoke at home.

The children who are suffering from allergic rhinitis having significant higher odds of(59.4) of developing otitis media compared to the children who are not suffering from allergic rhinitis. The children who exposed to passive smoking by family members having significant higher odds of (5.576) of developing otitis media than the children who were not exposed to passive smoking. The children who exposed to wood smoke at home were having significant higher odds of (2.893) of developing otitis media than the children who were not exposed to wood smoke at home.

DISCUSSION

7.0 DISCUSSION

Ear Disease is one of the major public health concern in developing countries. The pattern of ear diseases differ in different countries and with in various regions of the country. Ear Diseases in children are very much influenced by overcrowding, socio economic status, parental education, recurrent respiratory tract infections, allergic rhinitis, snoring and passive smoking.

This school based cross sectional study was done to estimate the prevalence of common ear problems and associated factors among Government primary school children. This study was carried out in 18 selected schools in rural areas of kancheepuram block of kancheepuram District in Tamilnadu.

7.1 OVERALL PREVALENCE OF EAR PROBLEMS

The study sample comprised of 360 students with 178(49.4%) boys and 182(50.6%) girls Among study groups of 360 students 176(48.9%) of them were having ear problems. it correlates with the report of Sophia et al in rural south India 51%.This prevalence was lower than the prevalence of various studies conducted by Rao etal in Karnataka(68.1%) [41] , prakash adikari et al (81.6%) in Kathmandu [24] ,and prakash adikari etal in 2007 in Nepal school children(75.7%) [36].This differences in reported rates may be a reflection of methodological differences between reported studies namely the classification used for clinical symptoms ,signs and diagnostic categories and number of problems included in the study.

7.2 PREVALENCE OF INDIVIDUAL EAR PROBLEMS

WAX

In this study the prevalence of Ear wax (36.7%). This was the most common ear disease observed in rural children of Kancheepuram block. This is not surprising that wax in this study obstructing the tympanic membrane is relatively common, because in majority of cases it is asymptomatic and therefore not an indication for seeking medical care or attending hospitals. This prevalence of 36.7% was found to be lower than the prevalence of various studies conducted by A-I kandhari etal[32] 54.6%, Prakash adikari etal[36] 62%, Prakash adikari etal[24] 60.6% in Kathmandu,and Rao etal[41] 63.1% in South India. This difference could be attributed to difference in case definition for wax. This present study included only impacted wax, but Prakash adikari etal had taken both impacted wax and un impacted wax. The study conducted by Rao et al included the children of only school entry age (6 to 7 years) but this study included the children of 6to 10 yrs. In this study among the 132 students who had wax, 13 (9.8%) of them were having hearing impairment by audiometry. However wax occlusion is a preventable cause of hearing impairment, when a few db losses at a particular threshold level may affect educational performance. So all the primary health care providers should be trained for wax removal. Simple measures of wax removal of can reduce the hearing impairment due to wax.

CSOM

CSOM is the most common cause of persistent hearing impairment among children and young adults in most of the developing countries. This study observed that

CSOM was the second most common ear problem in rural children. It showed the prevalence of (4.4%), and it was almost similar to the study by adikari et al [29]2006 which was 5%, Rupa et al in rural south India 6.2%, [38] .prakash adikari et al [36]2008 found 5.7%, in Malaysian study Mazharul shaheen et al [10] identified 5.6%.. But this prevalence was higher than the prevalence of swart et al [17] (3%), ingabastos et al [18] (1.6%) , and David et al [25] (1%) ,The main reason for the higher prevalence was ignorance of the parents regarding the complications of having the disease and another reason was inappropriate care of infected ear in initial stage. Some of the reason for the difference include absence of regular screening programs for ear problems , low socioeconomic status , and scarce of specialist care. Among the 16 students with csom15 (93.7%) of them had tubo tympanic type (safe type), 1 student (6.3%) had attico antral type (unsafe type).among the 16 students with Csom 15 (93.7%) had hearing impairment. Recognition of ASOM and its predisposing factors as well as suitable treatment with systemic antibiotics at the primary care level it self will prevent its progression to CSOM , would also help to decrease the overall prevalence of CSOM and hearing impairment.

OTITIS MEDIA WITH EFFUSION (OME)

In this study this is the third common ear problem observed with a prevalence of 15(4.2%).it correlates with the report by prakash adikari et al in 2000 was 4.7%, prakash adikari et al in 2007 was 3.7% [24 36] .In most of the developed countries this was the commonest ear problem observed. Various studies showed higher prevalence than this study like Annie Jacob et [37] in south India in 1997 reported(9.9%), prebenhomoe et al (23%) [20],brain d etal (32%). [21].This could be attributed to different case definition for diagnostic purpose. Out of 15 students with OME 11

(73.3%) had.hearing impairment. In most of the time these children are asymptomatic. So the hearing impairment among them mostly un noticed by parents and teachers. So early diagnosis by routine screening with otoscope by primary care doctors, audiometry screening and appropriate treatment will reduce the burden in large level.

ACUTE OTITIS MEDIA (AOM)

In this study the reported AOM prevalence was 1.4%, this is almost similar to the study conducted by prebenhomoe et al in Greenland[20] was 1.3%,prakash adikari et al [24] in 2000 1.4%.,Sophia et al [9] in south India 2007 identified 1.5%,and Modhkhari et al [16] in Malaysian study 1%. Guidelines for use of antibiotics to treat otitis media in children should be provided to primary health care providers and suitable antibiotics for dispensing should be available at primary health care facilities. Early diagnosis and appropriate management will reduce the burden in large level.

OTITIS EXTERNA

In this study the reported otitis externa prevalence was 4(1.1%), it correlates with the study finding of prakash adikari et al [36] in 2000 was (1.4%), Rao et al in rural south India(1.5%)[41] and prakash adikari et al in 2007 (1%) [24] .

OTOMYCOSIS

In this study observation the prevalence of otomycosis was (.8%),this is almost similar to the study conducted by Rao et al[41] in south India(.2%),and Moddkhari et al [16](.4%).out of 4 students with otomycosis 1(25%) had hearing impairment. Simple strategy of health education about the ear hygiene could commonly reduce this load of hearing impairment in this condition.

HEARING IMPAIRMENT

In this study hearing impairment prevalence was 10.6% by audiometry testing. This is almost similar to the findings found by Rao et al in Karnataka state11.9%.[41] This was higher than the prevalence of study conducted by swart et al in Swaziland[17] 5.5%,J.Hatcher et al[19] in Kenya school children5.6%.In this study population all the 38 students showed conductive hearing impairment. Out of 38 students 29(76.3%) of them were having mild impairment, 9(23.7%) of them were having moderate impairment, none of them were suffering from severe impairment..Nearly 50% hearing impairment can be prevented by primary prevention. All the primary health care doctors and other health workers should be provided additional training in the identification and management of ear diseases and hearing impairment.

7.3 SOCIO DEMOGRAPHIC CHARACTERISTICS AND EAR PROBLEMS

AGE AND SEX WITH EAR PROBLEMS

The prevalence of ear problems was highest in the age group of 6-7years.and this pattern showed a significant association. (p=.034). similar association has been reported by S.A.zeissel et al [47] in African American children and R.caylon et al in turkey.[44] Children possibly maintain good personal hygiene as they grow older, this may be the reason in this study group the younger age group affected more. Among the students the ear problems was slightly higher among male children than female children which was statistically not significant. Similar reports found by David et al [25] in Jerusalem children and preben homoe et al. [20] But kamal eldrin et al [23] in Egypt children found that ear problems are more with male children.

SOCIO ECONOMIC STATUS AND EAR PROBLEMS

It is generally concluded that ear diseases have a higher prevalence in communities of lower socio economic group due to their poor living standard. In addition to the virulent of the organisms socio economical and cultural factors un doubtly account for considerable difference in prevalence of complicated otitis media in various parts of the world[75]. The prevalence of ear problems were more among students belonging to class IV followed by class III socioeconomic class than students belong to class I and class II socio economic class. This association was statistically significant...Similarly the poor socio economic group are more affected with otitis media and this was found by Akil Chandra biswas et al [27],D.w.Teele et al ,J.I.paradise et al [53],R.caylan etal [44] and A.O.Lassi etal[45] in Nigeria.

OVERCROWDING AND EAR PROBLEMS

Among the study participants the prevalence of ear problems was 57.9% among those who live in overcrowded house against 15.9% among those who live in house without over crowding.T.xenellis et al[46], S.S.zeissel et al[47], and Fliss et al[48] have identified strong association between overcrowding and ear problems. This could be attributed to less ventilation,humidity, and poor hygiene, though they are more prone to get recurrent URI and subsequently suffer from CSOM..It becomes clear that those who are residing in overcrowded place are at higher risk of developing ear problems.

The prevalence of ear problems among other family members increases the risk of ear problems in children. .This study showed the significant association..

(p=0.011).this finding correlates with a report by Rao et al[41] in school entry age children.

PERSONONAL HYGIENE AND EAR PROBLEMS

Among the students who have a habit of daily bathing, who was wearing clean dress, who doesn't have dental caries and who doesn't have nasal discharge are having lower prevalence of ear problems .this was statistically significant.

PARENTRAL EDUCATION AND EAR PROBLEMS

The prevalence of ear problems was higher among students 65.9% whose mothers had less than high school education than whose mothers had high school education21.7%..This could be attributed to when the mothers had higher education the health seeking behavior practices are good. In our culture in most of the houses mother is the care taker of the children. So when the mothers had higher education the ear problems are less. It correlates with the finding by A.k.Verma et al[60]. In this study association between father's education and ear problems are not statistically significant.

EAR CLEANING PRACTICES AND EAR PROBLEMS

In this study observation for ear cleaning 161 students used buds, 16 students used feather, 52 students used cloth with stick, 2 students used oi l and, 81 students used safety pin. In this study observation no significant association was found between frequency of ear cleaning and ear problems, material used for ear cleaning and ear problems. Still in rural areas most of the people are using sharp material (safety pin) for ear cleaning. Sometimes it will damage the tympanic

membrane..simple measures of health education will be helpful to manage this Situation.

7.4 OTHER RISK FACTORS AND EAR PROBLEMS

PASSIVE SMOKING AND EAR PROBLEM

Among the study participants the prevalence of ear problems was 61.5%, among those exposed to passive smoke by family members against 45.4% among those without exposed to passive smoking..Meta analytic review by M.Udari et al[49], C.stenstorm et al[50], R.A.Etez et al[52],H.Gunasekara et al[56], and G.Karevid et al[57] have identified a strong association between passive smoking and ear problem. ..

RECURRENT RESPIRATORY TRACT INFECTION AND OTITIS MEDIA

This study found that there is a strong association between recurrent respiratory tract infection and otitis media.(AOM,CSOM,COM).The students who had frequent attacks of respiratory tract infection(more than 3 attacks per 6months), the prevalence of otitis media was high.(P=0.000).This similar findings reported by E.L.vanderveen et al, [59] J.E.paterson et a[153] in Pacific islands, Cherian et al [55] and Sophia et al from south India.

ALLERGIC RHINITIS AND OTITIS MEDIA

In this study the prevalence was 53.8% among children suffering from allergic rhinitis and where it was 2.6% in children not having allergic rhinitis problem. This was found to be statistically significant. The same findings reported by Y.E.Bentdal et al [58] and C.Stenstorm et al [50].

SNORING AND OTITIS MEDIA

Due to adenoid enlargement the children will have the symptom of snoring. They are more prone to get otitis media. In this study among the students who were snoring 83.3% had otitis media, as compared to students who did not snore (4.8%) which was to be statiscally significant(P=<.05).similar findings revealed by R.Caylon et a[l 44] and Paterson et al [53]A study conducted by Sophia et al [9] in 2007 in rural south India found the significant association between snoring and otitis media.

HOUSEHOLD SMOKE (WOOD) AND OTITIS MEDIA

Among the study participants the prevalence of otitis media was 13.9% among the children who exposed to wood smoke compared to those who had not expose to wood smoke5.1%. This difference was statistically significant. This was proven by Y.B.Amusa et al [51],J.Xenellis et al [46]. and Sophia et al [9] . This study found significant association was found between wood smoke and otitis media. But no significant association was found between wood smoke and overall ear problems.

SUMMARY

8.0 SUMMARY

This was a cross-sectional study carried out in 18 selected government primary schools in Kancheepuram block of Kancheepuram district, Tamilnadu to find out the prevalence of common ear problems among children (Ist standard to Vth standard), prevalence of risk factors associated with ear problems and to find out the association of ear problems with socio demographic characteristics, personal hygiene, consanguineous marriage, family members suffering from ear problems, recurrent respiratory tract infections, snoring (due to adenoid enlargement),allergic rhinitis, passive smoking and house hold smoke.

This study used a 3 stage sampling method. From 18 selected schools 360 students participated in the study. After getting the consent the students were examined for personal hygiene and ear problems. External ear examination and otoscope examination were done. To identify the hearing impairment the whispered voice test was done for all randomly selected students. Those who were found abnormal in whisper test were subjected to audiogram. By WHO guidelines if the child has 26-40 db loss in audiogram denotes as slight impairment, 41-60 db loss denotes moderate impairment, 61-80 db loss denotes severe impairment, more than 80 db loss denotes as profound impairment.

After examination of the child a pre tested semi structured questionnaire in Tamil consisting of socio demographic details, H/o consanguineous marriage, any family members suffering from ear problem, .H/o passive smoking, what fuel used for cooking, and any history suggestive of ear problem for the child were obtained from the parents or available family members at the time of home visit.

The study revealed the following findings

The prevalence of common ear problems among primary school children was 176(48.9%) Among the various ear problems in this study impacted wax was the most common ear problem with a prevalence of 132(36.7%),followed by chronic otitis media 16(4.4%).otitis media with effusion 15(4.2%). Acute otitis media 5 (1.4%). Otitis externa 4 (1.1%) and Oto mycosis 4 (1.1%), Among the 16 students with CSOM ,15 (93.7%) of them having tubo tympanic type (safe type) and 1 student (6.3%) with attic granulation (un safe type). Among the various symptoms ear block was the most common symptom (40.3.%) reported followed by itching (18.1%%). Among 360 students 38(10.6%) of them having hearing impairment by audiometry testing. All the 38 students had conductive impairment. Among the 132 students with wax 13(9.8%) had hearing impairment, among the 16 students with CSOM 15 (93.8 %) students showed hearing impairment, Among15 children with otitis media with effusion 11(73.3%) showed hearing impairment, among the 4 children with otomycosis 1(25%) had hearing impairment, In this study no hearing impairment was found in students suffering from Acute otitis media and Otitis externa.

On analysis of factors with ear problems the prevalence of ear problems was found to be significantly associated with younger age group. (6years and 7years). Among the students the ear problems was slightly higher among boys than girls. But this was not statistically significant. There was a significant association of ear problems with factors like mother's education, low socio economic status, overcrowding, personal hygiene, family members suffering from ear problem and passive smoking. In this study recurrent respiratory tract infection, snoring, and allergic rhinitis turned out to be a significant risk factor. The factors like father's

educational status, sex of the child, ear cleaning practices like frequency of ear cleaning, material used for ear cleaning were found to be no significant association with the ear problem in the study group. Exposed to house hold smoke was found to be significant association with otitis media only and not with overall ear problems.

This study establishes the fact that the prevalence of ear problems and hearing impairment are high in Government primary school children. To overcome these problems communities need to be made more aware of symptoms related to ear problems, personal hygiene, and ear hygiene,,so that care at primary level can be initiated. By WHO guidelines regular screening of primary school children for ear problems and hearing impairment should be done. All the primary health care staffs should be trained well to diagnose and treatment of ear problems.

LIMITATIONS

9.0 LIMITATIONS

- The study has been carried out only in Government primary schools of Kancheepuram District. It may not represent the problem in private school children.
- The study was done only in rural area, it may not represent the problem in urban school children.
- Children above V th standard not included in the study.
- Those children who were not going to schools were not included in the study.
- Further studies can be done with focus on individual ear diseases.
- To identify hearing impairment, Whisper test was done for all children. But, the more specific test of Audiometry was done for those were diagnosed by Whisper test (due to high cost of Audiometry test).

RECOMMENDATIONS

10.0 RECOMMENDATIONS

- The study estimated that 48.3% of children had ear problems. Even after the successful implementation of modified school health programme , the prevalence of ear diseases were still high among primary school children. Hence special attention should be given for ear problems in school health program..

- Primary care nurses ,and doctors should be given additional training on wax removal, identification and management of ear diseases and hearing impairment..

- A simple hearing screening test to detect hearing impairment among children can be administrated in the classroom by trained teachers need to be devised, so that the student. Can be screened yearly during initial few years at school.(BY WHO Guidelines).

- Regular school visits to screen students for persistent rhinorrhoea, obstructed breathing and otitis media should be the part of the designated National deafness control programme.

- The effect of passive smoking on respiratory and otological health of the child should be highlighted in all anti tobacco campaigns.

- Regular health education should be given to both teachers and parents regarding ear hygiene ,personal hygiene and symptoms of common ear problems.

- Children had exposure to wood smoke in household are having higher prevalence of otitis media..Hence the attention should be focused on encouraging the use of cleaner fuels(LPG) or chimneys.

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ANNEXURES

ANNEXURE – I

INFORMATION SHEET

- We are conducting a study on the prevalence of common ear problems among Government primary school children in Kancheepuram Block of Kancheepuram District.

- The purpose of this study is to diagnose common ear problems with questionnaire, otoscope and Puretone audiometry.

- The privacy of the participants in the research will be maintained throughout the study. In the event of any publication or presentation resulting from the research, no personally identifiable information will be shared.

- Taking part in this study is voluntary. You and your son/daughter are free to decide whether to participate in this study or to withdraw at any time; your decision will not result in any loss of benefits to which you are otherwise entitled.

- The results of the special study may be intimated to you at the end of the study period or during the study if anything is found abnormal which may aid in the management or treatment.

Signature of investigator

Signature or Thumb impression of the participant's parent

Date:

தகவல் தாள்

காஞ்சிபுரம் பகுதியில் அரசு தொடக்கப்பள்ளிகளில் பயிலும் மாணவர்களிடையே நிலவும் காது வியாதிகள் பற்றிய ஆய்வு

காஞ்சிபுரம் பகுதியில் அரசு தொடக்கப் பள்ளிகளில் பயிலும் மாணவர்களிடையே நிலவும் காதுவியாதிகள் மற்றும் காரணங்களை கண்டறிவதே இந்த ஆராய்ச்சியின் நோக்கமாகும்.

இன்றைய காலத்திலும் காது வியாதிகள் ஆரம்பபள்ளி மாணவர்களிடையே அதிகமாக காணப்படுகின்றன. சுயசுத்தமின்மை, இட நெருக்கடி, குழந்தைகள் முன்பு புகைப்பிடித்தல், வீட்டில் விறகு அடுப்பு உபயோகித்தல், சுகாதாரமற்ற குடிசை வீட்டில் வாழுதல், அடிக்கடி குழந்தைகள் இருமல், சளியால் பாதிக்கப்படுதல், காது வியாதிகள் பற்றி அறியாமை போன்ற காரணங்களால் இவை ஏற்படுகின்றன. இக்காரணங்களை தடுப்பதன் மூலம் குழந்தைகளை காது வியாதிகளிலிருந்து பாதுகாக்க முடியும். இந்த ஆராச்சியில் காது பரிசோதனை செய்யும் கருவி. காது கேளா தன்மை அறியும் கருவி பயன்படுத்தப்பட்டு நோய் கண்டறியப்படுகிறது, தேவைப்படும் குழந்தைகளுக்கு காது அழுக்கு அகற்றப்படும்.

தங்கள் மகள் / மகன் இந்த ஆராய்ச்சியில் பங்கேற்க நாங்கள் விரும்புகிறோம்.

இந்த ஆராய்ச்சியின் முடிவுகளை அல்லது கருத்துக்களை வெளியிடும்போது அல்லது தங்கள் மகள் / மகன் பெயரையோ அடையாளங்களையோ வெளிவிட மாட்டோம் என்பதை தெரிவித்துக் கொள்கிறோம்.

இந்த ஆராய்ச்சியில் நீங்களும் உங்கள் மகள் / மகன் பங்கேற்பதும் உங்களுடைய விருப்பத்தின் பெயரில் தான் இருக்கிறது. மேலும் நீங்கள் எந்நேரமும் இந்த ஆராய்ச்சியிலிருந்து விலகிக்கொள்ளலாம் என்பதையும் தெரிவித்துக் கொள்கிறோம்.

இந்த ஆராய்ச்சியின் முடிவுகளை ஆராய்ச்சியின் போதோ அல்லது ஆராய்ச்சியின் முடிவின் போதோ தங்களுக்கு தெரிவிக்கப்படும் என்பதையும் தெரிவித்துக்கொள்கிறோம்.

பெற்றோர் கையொப்பம்

பகுதி III பரிசோதனை

I.குழந்தையின் தன் சுத்தம் ஆய்வு

1	தலைமுடி	சுத்தமின்மை	சுத்தம்
2	கண்	சுத்தமின்மை	சுத்தம்
3	மூக்கு	சளி வடிதல்	சுத்தம்
4	வாய்	சொத்தை பற்கள் உள்ளன	சொத்தை பற்கள் இல்லாமை
5	நகம்	நகம் வெட்டாமல் அழுக்குடன்	நகம் சுத்தமாக வெட்டி இருத்தல்
6	பள்ளிச் சீருடை	சுத்தமின்மை	சுத்தம்
7	காலணி	இல்லை	உள்ளது

II.காது பரிசோதனை

INFORMED CONSENT FORM

Title of the dissertation:

"A cross sectional study on the prevalence of common ear problems among Government primary school children in Kancheepuram Block of Kancheepuram District, Tamilnadu, 2012"

Name of the participant ; Age/Sex

Name of the participant's parent: Age/sex

(1) I have been explained in detail about the study and its procedure. I confirm that I had completely understood the study and have had the opportunity to ask questions

(2) I understand that my son/daughter's participation in the study is voluntary and that my son/daughter is free to withdraw at any time, without giving any reason, without their medical care or legal rights being affected.

(3) I understand that the principal investigator, others working on the investigator's behalf, the Ethics Committee and the regulatory authorities will not need my permission to look at my health records both in respect of the current study and any further research t hat may be conducted in relation to it, even if I withdraw from the trial. I agree to this access. However I understand that my or myson/daughter's identity w ill not be revealed in any information released to third parties or published.

(4) I agree not to restrict the use of any data or results that arise from this study provided such a use is only for scientific purpose(s).

(5) I agree to my son/daughter taking part in the above study.

Signature of investigator

Signature or thumb impression of participant's parent

_____ _____

Date:

ஆராய்ச்சி ஒப்புதல் கடிதம்

ஆராய்ச்சி தலைப்பு : காஞ்சிபுரம் பகுதியில் அரசு தொடக்கப்பள்ளிகளில் பயிலும் மாணவர்களிடையே நிலவும் காது வியாதிகள் பற்றிய ஆய்வு

பெயர் : தேதி :

வயது : பால் : ஆராய்ச்சி சேர்க்கை எண் :

இந்த ஆராய்ச்சியின் விவரங்களும் அதன் நோக்கங்களும் முழுமையாக எனக்கு தெளிவாக விளக்கப்பட்டது.

எனக்கு விளக்கப்பட்ட விஷயங்களை நான் புரிந்து கொண்டு நான் எனது சம்மதத்தைத் தெரிவிக்கிறேன்.

என் மகன்/மகளுக்கு காது பரிசோதனை செய்யும் கருவி, காது கேளா தன்மை அறியும் கருவி மூலம் பரிசோதனை செய்துக் கொள்ள சம்மதம். தேவைப்பட்டால் காது அழுக்கு என் குழந்தைக்கு அகற்றப்பட சம்மதம்.

இந்த ஆராய்ச்சியில் பிறரின் நிர்ப்பந்தமின்றி என் சொந்த விருப்பத்தின் பேரில் என் மகனோ/மகளோ பங்கு பெறவும் மற்றும் இந்த ஆராய்ச்சியிலிருந்து எந்நேரமும் பின்வாங்கலாம் என்பதையும் அதனால் எந்த பாதிப்பும் ஏற்படாது என்பதையும் நான் புரிந்து கொண்டேன்.

நான் காது சம்பந்தமான நோய்கள் குறித்த இந்த ஆராய்ச்சியின் விவரங்களைக் கொண்ட தகவல் தாளைப் பெற்றுக் கொண்டேன்.

நான் என்னுடைய சுயநினைவுடன் மற்றும் முழு சுதந்திரத்துடன் இந்த மருத்துவ ஆராய்ச்சியில் என் மகனோ/மகளோ சேர்த்துக் கொள்ள சம்மதிக்கிறேன்.

பெற்றோர் கையொப்பம்

A CROSS SECTIONAL STUDY ON THE PREVALENCE OF COMMON EAR PROBLEMS AMONG GOVERNMENT PRIMARY SCHOOL CHILDREN IN KANCHEEPURAM BLOCK OF KANCHEEPURAM DISTRICT, TAMILNADU, 2012.

QUESTIONNAIRE

I) SOCIODEMOGRAPHIC DETAILS:

1) Name :

2) Age :

3) Sex :

4) Standard :

5) School :

6) Residential Address :

7) Respondent : 1) Mother 2) Father 3) Others

8) Religion : 1) Hindu 2) Muslim 3) Christian 4) Others

9) Father's Education : 1) Illiterate 2) I-V Std 3) VI-XII Std
4) Degree 5) PG Degree 6)Others

10) Mother's Education : 1) Illiterate 2) I-V Std 3) VI-XII Std
4) Degree 5) PG Degree 6) Others

11) Father's Occupation : 1) Not working 2) Unskilled 3) Semiskilled
4) Skilled Manual 5) Skilled Nonmanual
6) Semi Professional 7) Professional

12) Mother's Occupation : 1) Not working 2) Unskilled 3) Semiskilled
4) Skilled Manual 5) Skilled Nonmanual
6) Semi Professional 7) Professional

13) H/o. consanguineous marriage in parents : 1) Yes 2) No

14) Total income of the Family : _____

15) Total members of the Family : _____

16) Type of House : 1) Kutcha 2) Semipucca
3) Pucca 4) Others

17) How many rooms in your house? : 1) One 2) Two
3) Three 4) Four

18) Do you give bath daily to your child? : 1) Yes 2) No

II) HISTORY REGARDING EAR PROBLEM:

19) Did your child complaints of ear pain in the past 2 weeks? : 1) Yes 2) No

20) Is there ear discharge for your child? : 1) Yes 2) No

21) If yes, duration of discharge : 1) < 2 weeks
2) > 2weeks

22) Have your child ever had blocking sensation of the ear? : 1) Yes 2) No

23) Have your child ever had itching sensation in the ear? : 1) Yes 2) No

24) Does your child turns to your call immediately? : 1) Yes 2) No

25) Do you have the habit of cleaning your child's ear often ? : 1) Yes 2) No
If yes, how often do you clean? : 1) Once a week
2) Once in 2 weeks
3) Once in a month
4) Others

26) How do you clean your child's ear? : 1) Buds
2) Feather
3) Cloth with stick
4) Oil
5) safety pin
6) others

27) Do any of the family members suffer from hearing problem? : 1) Yes 2) No

28) Does your child have snoring problem? : 1) Yes 2) No

29) How often have your child suffered from attacks of cough and cold in past 6 months ? : 1) 0 2) 1 to 3 3) > 3

30) Does your child frequently get running nose, sneezing When exposed to dust, pollen etc? : 1) Yes 2) No

31) Did any one of the family member smoke in front of the child : 1) Yes 2) No

32) What material do you use for cooking :

33) Did you consult a doctor previously for the ear problem of your child? : 1) Yes 2) No

If yes, specify the treatment :

III. CLINICAL EXAMINATION

Personal Hygiene Examination

Hair	:	1) Clean 2) Unclean		
Eyes	:	Any Discharge	1) Present	2) Absent
Nose	:	Nasal Discharge	1) Present	2) Absent
Oral cavities	:	Dental caries	1) Present	2) Absent
Nail	:	Clean trimmed nail	1) Present	2) Absent
Dress	:	1) Clean 2) Unclean		
Barefoot	:	1) Yes 2) No		

IV. EAR EXAMINATION :

		Right Ear	Left Ear
Auricle	**:**	1) Normal 2) Malformed	1) Normal 2) Malformed

a) External Ear :

		Right Ear	Left Ear
1.	Skin Inflammation	1) Present 2) Absent	1) Present 2) Absent
2.	Discharge	1) Present 2) Absent	1) Present 2) Absent
3.	Wax (Impacted)	1) Present 2) Absent	1) Present 2) Absent

b) Otoscope Findings :

EAR DRUM:

		Right Ear	Left Ear
1.	Normal	1) Yes 2) No	1) Yes 2) No
2.	Tympanic Membrane Bulging, congestion	1) Present 2) Absent	1) Present 2) Absent
3.	Tympanic Membrane Retraction or dullness	1) Present 2) Absent	1) Present 2) Absent
4.	Tympanic Membrane Perforation	1) Present 2) Absent	1) Present 2) Absent

MIDDLE EAR

5.	Discharge	1) Present 2) Absent	1) Present 2) Absent
	- If present, type of the discharge	1)Serous 2)Purulent	1)Serous 2)Purulent

c) Hearing Test:

1. When we ask questions the child ask us to repeat? : 1) Yes 2) No

2. When we ask question the child bend forward to listen? : 1) Yes 2) No

3. When we ask the question the child move his/her head towards the examiner? : 1) Yes 2) No

Level tested with the voice test	Grade of impairement
Able to hear whispers	Normal hearing
Able to hear, repeat words spoken in normal voice at 1 meter	Slight impairment
Able to hear, repeat words using raised voice at 1 meter	Moderate impairment
Able to hear some words when shouted into the ear.	Severe impairment
Unable to hear and understand even a shouted voice	Profound impairment

V. DIAGNOSIS

1.	Wax (Impacted)	Right	Left
2.	Otitis Externa	Right	Left
3.	Otomycosis	Right	Left
4.	Acute Otitis Media	Right	Left
5.	Chronic Otitis Media	Right	Left
6.	Otitis Media with effusion	Right	Left

VI. AUDIOGRAM

வினாப்பட்டி

பகுதி : I

1. குழந்தையின் பெயர் :
2. வயது :
3. பாலினம் :
4. வகுப்பு :
5. பள்ளி :
6. வீட்டு முகவரி :

7. **குழந்தையைப்பற்றி விவரம்**

தெரிவிப்பவர் : 1. அம்மா, 2. அப்பா, 3. மற்றவர்கள்

8. **மதம்**

1. இந்து, 2. முஸ்லீம், 3. கிறிஸ்தவர், 4. மற்றவர்

9. **தந்தையின் கல்வித் தகுதி**

1.	எழுத படிக்க தெரியாதவர்,	2.	1 – 5,
3.	6 – 12,	4.	பட்ட படிப்பு
5.	முதுகலைபட்ட படிப்பு,	6.	மற்ற படிப்பு

10. **தாயின் கல்வித் தகுதி**

1.	எழுத படிக்க தெரியாதவர்,	2.	1 – 5,
3.	6 – 12,	4.	பட்ட படிப்பு
5.	முதுகலைபட்ட படிப்பு,	6.	மற்ற படிப்பு

11. தந்தையின் தொழில்

12. தாயின் தொழில்

13. மிகவும் நெருங்கிய உறவினர்களுக்குள் திருமணம் ஆனவர்களா?

1. ஆம், 2. இல்லை
(மாமன் முறை, மாமன் மகள் முறை, அத்தை மகள்)

14. குடும்ப மொத்த வருமானம் :

15. குடும்ப நபர்களின் எண்ணிக்கை :

16. வீட்டின் அமைப்பு :

17. வீட்டில் உள்ள அறைகளின் எண்ணிக்கை

1. ஒன்று, 2. இரண்டு,
3. மூன்று, 4. நான்கு

18. தினமும் உங்கள் குழந்தையை குளிக்க வைக்கிறீர்களா?

1. ஆம், 2. இல்லை

பகுதி II

19. கடந்த 2 வாரத்தில் உங்கள் குழந்தை காது வலி என கூறியதா?

1. ஆம், 2. இல்லை

20. குழந்தைக்கு காதில் சீழ் வடிகிறதா?

1. ஆம், 2. இல்லை

21. ஆம் என்றால்

1. 2 வாரங்களுக்கு குறைவாக

2. 2 வாரங்களுக்கு மேலாக

22. உங்கள் குழந்தைகளுக்கு எப்பொழுதாவது காது அடைப்பு இருந்திருக்கிறதா?

1. ஆம், 2. இல்லை

23. உங்கள் குழந்தைகளுக்கு எப்பொழுதாவது காது அரிப்பு இருந்திருக்கிறதா?

1. ஆம், 2. இல்லை

24. உங்கள் குழந்தை நீங்கள் அழைக்கும் போது உடனே திரும்புவது உண்டா?

1. ஆம், 2. இல்லை

25. உங்கள் குழந்தையின் காதை அடிக்கடி சுத்தம் செய்யும் பழக்கம் இருக்கிறதா?

1. ஆம், 2. இல்லை

ஆம் என்றால்

1. வாரத்திற்கு ஒரு முறை 2. இரண்டு வாரத்திற்கு ஒரு முறை
3. மாதத்திற்கு ஒரு முறை 4. மற்றவை

26. உங்கள் குழந்தையின் காதை எப்படி சுத்தம் செய்வீர்கள் ?

1. பஞ்சு குச்சி (Buds) 2. கோழி இறகு
3. துணி 4. எண்ணெய் 5. ஊக்கு

27. உங்கள் குடும்பத்தில் யாராவது காது கேளாமல், காது கேட்பதில் குறைவு இருக்கிறதா?

1. ஆம், 2. இல்லை

28. உங்கள் குழந்தை தூங்கும் போது குரட்டை விடுகிறதா?

1. ஆம், 2. இல்லை

29. உங்கள் குழந்தை கடந்த 6 மாதத்தில் எத்தனை முறை இருமல், சளியால் பாதிக்கப்பட்டிருக்கிறது?

1. 0 2. 1–3
3. 3 – மேல்

30. உங்கள் குழந்தையை அடிக்கடி தூசிபடும் போது தும்மல், மூக்கு ஒழுகுதலால், பாதிக்கப்படுகிறதா?

1. ஆம், 2. இல்லை

31. சமைப்பதற்கு என்ன எரிபொருள் உபயோகிக்கீறீர்கள் ?

32. இதற்கு முன்பாக உங்கள் குழந்தையின் காது தொந்தரவுக்காக மருத்துவரிடம் ஆலோசனை பெற்றிருக்கிறீர்களா?

1. ஆம், 2. இல்லை

33. ஆம் என்றால் விபரம் கூறவும்

ANNEXURE – III

SOCIO ECONOMIC CLASS BASED ON MODIFIED B.G.PRASAD'S CLASSIFICATION

As the study was done in rural area, modified B.G. Prasad's classification was used for socio economic classification. The calculation was done as follows:

Consumer Price Index for rural labourers in Tamilnadu for the month of May 2012=625

Multiplication factor = Value of consumer price index X 4.93/100

= 625 X 4.93/100

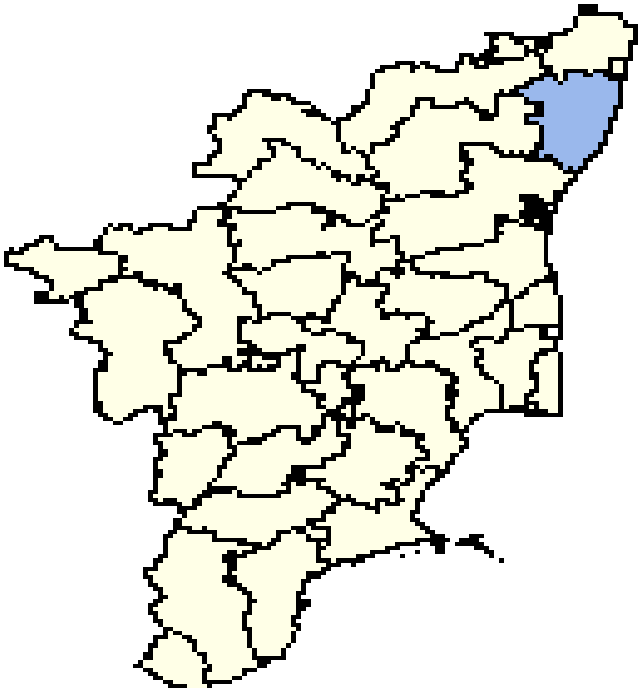
= 30.8

Modified BG Prasad's classification for may 2012 = Percapita income in 1961 X multiplication factor

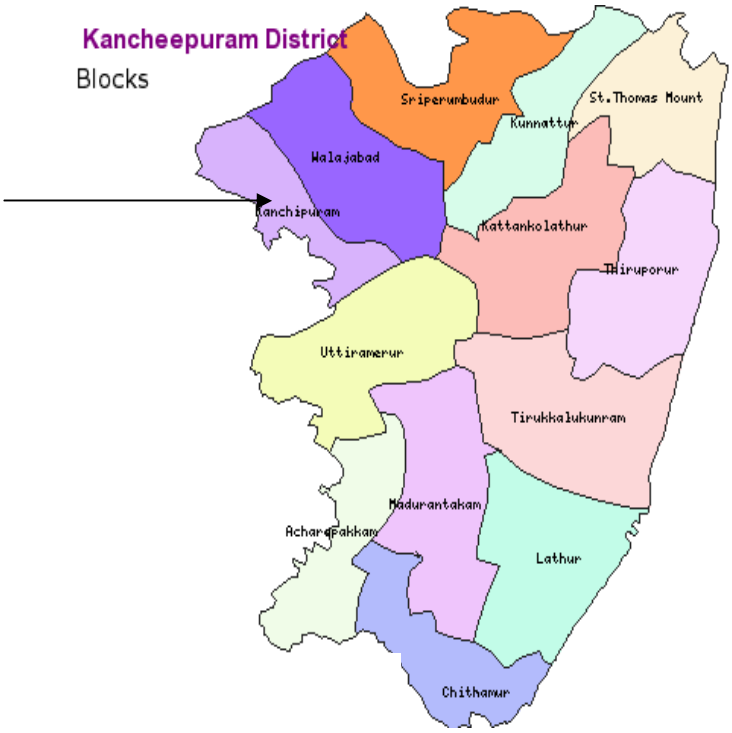
CLASS	OLD CLASSIFICATION 1961	FOR MAY 2012
I	100 & above	3080 & above
II	50-99	1540-3079
III	30-49	924-1539
IV	15-29	462-923
V	<15	<462

ANNEXURE IV

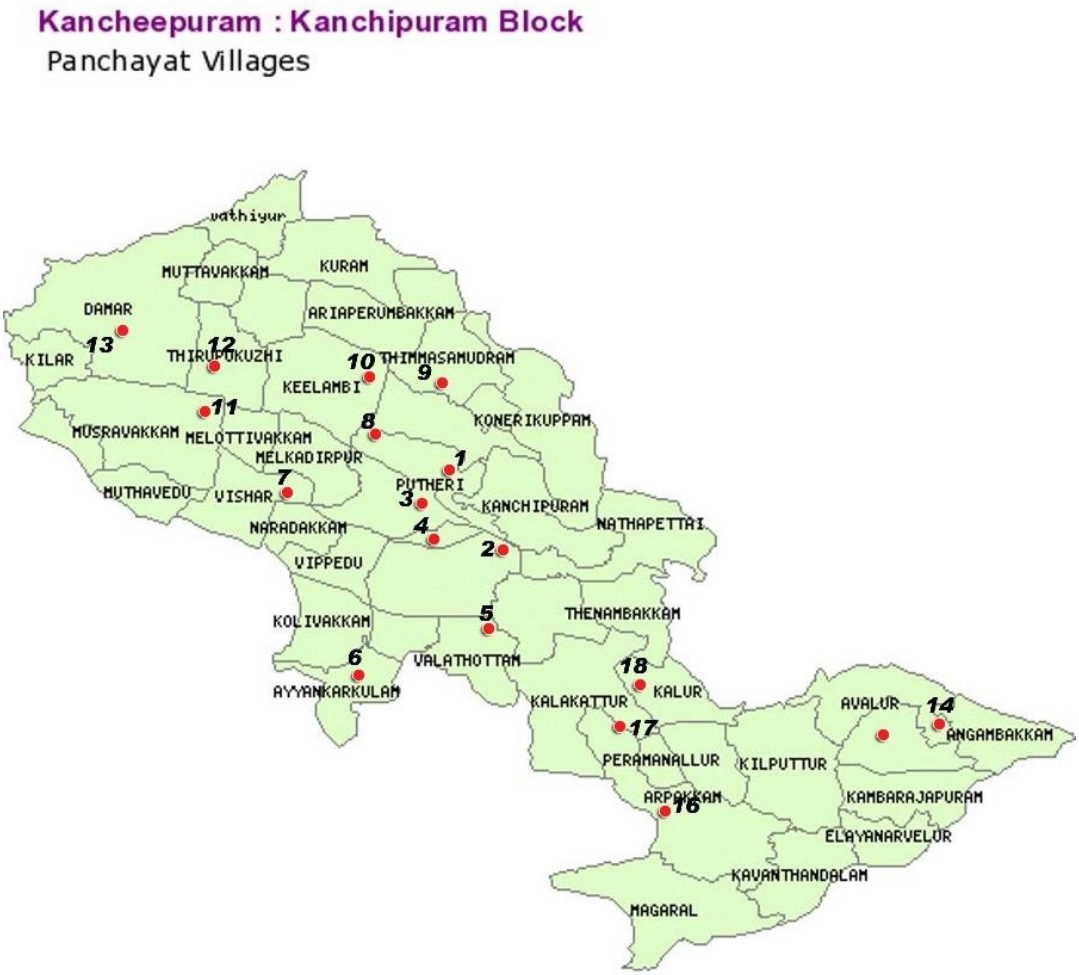
TAMILNADU MAP INDICATING KANCHIPURAM DISTRICT



KANCHIPURAM DISTRICT BLOCKS



SELECTED 18 SCHOOLS (●) IN KANCHIPURAM BLOCK



ANNEXURE V

LIST OF GOVERNMENT PRIMARY SCHOOLS IN KANCHEEPURAM BLOCK

S.NO	NAME OF THE SCHOOL	STRENGTH	CUMULATIVE
1	**PUTERI**	**42**	**42**
2	MELKATHIRPUR	78	120
3	METTUKUPPAM	112	232
4	NARAKUPPAM	28	260
5	PUTERI METTUCOLONY	33	293
6	**SEVILIMEDU**	**240**	**533**
7	**THIRUPPARATHIKUNRAM**	**109**	**642**
8	SEMBARAMBAKKAM	30	672
9	PONNIAMMAN PATTARAI	83	755
10	THULANGUM THANDALAM	64	819
11	**DAMAL COLONY**	**70**	**889**
12	MELBANGARAM	39	928
13	THAIPAKKAM	38	966
14	SIRUNAIP PERUKAL	68	1034
15	ARIYA PERUMBAKKAM	80	1114
16	**THIRUPPUKUZHI**	**281**	**1395**
17	**VISHAR**	**70**	**1465**
18	THATTI THOPPU	82	1547
19	APPAVU NAGAR	46	1593
20	CHINNAYANKULAM	62	1655
21	**VEDAL**	**77**	**1732**
22	KALUR	38	1770
23	MELPERAMANALLUR	17	1787
24	NELVELI	39	1826
25	ELAYANARVELUR	68	1894
26	**ARPPAKKAM**	**190**	**2084**
27	VAYALUR	36	2120
28	KIL PERAMANALUR	87	2207

29	CHITHATHUR	19	2226
30	**KANNADIAN KUDUSAI**	**52**	**2278**
31	AVALUR	158	2436
32	ASIRIYAR NAGAR	37	2473
33	ANJUR	24	2497
34	**KONERIK KUPPAM**	**28**	**2525**
35	VENKATAPURAM	47	2572
36	**AYYANGAR KULAM**	**316**	**2888**
37	KOLI VAKKAM	104	2992
38	**THIRUKKALIMEDU**	**321**	**3313**
39	**PERIYANATHAM**	**55**	**3368**
40	**C.S.M**	**259**	**3627**
41	KALANDAR	8	3635
42	PUDUPPALAYAM	114	3749
43	T.K.NAMBI	40	3789
44	PARASURAMA GRAMANI	18	3807
45	DHARGA MUSLIM	46	3853
46	**KAILASANATHAR**	**66**	**3919**
47	A.K.T	69	3988
48	YADHOTHAGARI	39	4027
49	KUPPUSAMY	31	4058
50	**THUMBAVANAM**	**139**	**4197**
51	GANDHI SALAI	57	4254
52	VADAKKU MADHA VEEDHI	91	4345
53	PATTALA	57	4402
54	**REDDIP PETTAI**	**47**	**4449**
55	NATHAP PETTAI	39	4488
56	KIL AMBI	117	4605
57	**ASUR**	**102**	**4707**
58	ORIKKAI	222	4929

ANNEXURE VI

KEY TO MASTER CHART

Variable	Label	Coding
sno	Serial Number	1,2,3etc
age	Age	6,7,8,9,10
sex	Sex	1=Male, 2 = Female
standard	Standard	1,2,3,4,5
respondent	Respondent	1 = mother 2= father 3 = others
religion	Religion	1 = hindu 2 = muslim 3 = Christian 4 = others
fathers_education	Father's Education	1 = illiterate 2 = I – V Std 3 = VI – XII Std 4 = Degree 5 = PG Degree 6 = others
mothers_education	Mother's Education	1 = illiterate 2 = I – V Std 3 = VI – XII Std 4 = Degree 5 = PG Degree 6 = others
fathers_occupation	Father's Occupation	1 = not working 2 = unskilled 3 = Semiskilled 4 = skilled manual 5 = skilled non manual 6 = semi professional 7 = professional
mothers_occupation	Mother's Occupation	1 = not working 2 = unskilled 3 = Semiskilled 4 = skilled manual 5 = skilled non manual 6 = semi professional 7 = professional
ho_consanguinous_marriage	H/o Consnguineous marriage in parents	1 = Yes 2 = No
total_income_of_the_family	Total income of the family	
total_members_of_the_family	Total members of the family	

type_of_house	Type of House	1 = Kutcha 2 = semi pucca 3 = pucca 4 = others
how_many_rooms_in_house	How many rooms in your house	1 = one 2 = two 3 = three 4 = four
daily_bath_to_child	Do you give bath daily to your child	1 = Yes 2 = No
co_ear_pain_in_the_past_two_weeks	Did your child complaint of ear pain in the past 2 weeks	1 = Yes 2 = No
ear_discharge	Is there ear discharge for your child	1 = Yes 2 = No
duration_of_discharge	If yes, what duration	1 = <2 weeks 2 = > 2 weeks 0 = NO
block_sensation_ear	Have your child ever had blocking sensation of the ear	1 = Yes 2 = No
itching_sensation	Have your child ever had itching sensation of the ear	1 = Yes 2 = No
turns_to_call_immediately	Does your child turns to call immediately	1 = Yes 2 = No
habit_of_cleaning_ear	Do you have the habit of cleaning your child's ear often	1 = Yes 2 = No
if_yes_often	If yes, how often do you clean	0 = NO 1 = once in a week 2 = Once in 2 weeks 3 = Once in a month 4 = others
how_do_you_clean_ear	How do you clean your child's ear?	0 = NO 1 = buds 2 = feather 3 = cloth 4 = oil 5= safety pin

any_other_family_members_suffer_from_ear_problems	Do any of the family members suffer from ear problems	1 = Yes 2 = No
snoring	Does your child have snoring problem	1 = Yes 2 = No
how_often_suffered_from_attacks_cold_cough_past_6_months	How often have your child suffered from attacks of cough and cold in past 6 months	1 = 0 2 = 1 to 3 3 = >3
suffer_sneeze_exposed_pollen	Allergic Rhinitis	1 = Yes 2 = No
family_member_smoke	Did any of the family member smoke in front of the child	1 = Yes 2 = No
material_use_for_cooking	What material do you use for cooking	1 = Gas 2 = wood
doctor_consulted_previously_for_ear_problm	Did you consult a doctor previously for ear problem	1 = Yes 2 = No
hair	Hair	1 = Clean 2 = Unclean
eyes_discharge	Eyes Any Discharge	1 = Present 2 = Absent
nasal_discherge	Nasal Discharge	1 = Present 2 = Absent
oral_cavities_dental_caries	Dental Caries	1 = Present 2 = Absent
nail_clean_trimmed_nail	Clean Trimmed Nail	1 = Present 2 = Absent
dress	Dress	1 = Clean 2 = Unclean
bare_foot	Bare foot	1 = Yes 2 = No
right_ear_auricle	Right ear Auricle	1 = Normal 2 = Malformed
left_ear_auricle	Left Ear Auricle	1 = Normal 2 = Malformed
skin_inflammation_right_ear	Right External Ear Skin Inflammation	1 = Present 2 = Absent
skin_inflammation_left_ear	Left External Ear Skin Inflammation	1 = Present 2 = Absent

discharge_rt	Right Ear Discharge	1 = Present 2 = Absent
discharge_lt_ear	Left Ear Discharge	1 = Present 2 = Absent
wax_rt_ear	Wax (impacted) Right Ear	1 = Present 2 = Absent
wax_lt_ear	Wax (impacted) Left Ear	1 = Present 2 = Absent
ear_drum_rteft_normal	Ear Drum Right Ear Normal	1 = Yes 2 = No
ear_drum_lft_ear	Ear Drum Left Ear Normal	1 = Yes 2 = No
tm_bulging_congestion_rght	Tympanic membrane Bulging, congestion, Right Ear	1 = Present 2 = Absent
tm_bulging_congestion_lft	Tympanic membrane Bulging, congestion, Left Ear	1 = Present 2 = Absent
tm_retraction_rt	Tympanic Membrane Retraction or Dullness Right Ear	1 = Present 2 = Absent
tm_retraction_lft	Tympanic Membrane Retraction or Dullness Left Ear	1 = Present 2 = Absent
tm_perforation_rt_ear	Tympanic Membrane Perforation Right Ear	1 = Present 2 = Absent
tm_perforation_lft_ear	Tympanic Membrane Perforation Left Ear	1 = Present 2 = Absent
middle_ear_discharge_rt_ear	Middle Ear Discharge Right	1 = Present 2 = Absent
middle_ear_discharge_left_ear	Middle Ear Discharge Left	1 = Present 2 = Absent
type_of_discharge	If present, type of the discharge Right	1 = serous 2 = purulent
type_of_discharge_lft_ear	If present, type of the discharge Left	1 = serous 2 = purulent
child_repeat_words	When we ask questions the child ask us to repeat	1 = Yes 2 = No
child_bend_forward_listen	When we ask question the child bend forward to listen	1 = Yes 2 = No

child_move_head_towards_examiner	When we ask the question the child move his/her head towards the examiner	1 = Yes 2 = No
grade_of_impairment	Grade of impairment	1 = Normal Hearing 2 = Slight Impairment 3 = Moderate Impairment 4 = Severe Impairment 5 = Profound Impairment
diag.rt.ear	Diagnosis Right Ear	1 = Normal 2 = Wax(impacted) 3 = Otomycosis 4 = Otitis Externa 5 = Acute Otitis Media 6 = Chronic Otitis Media 7 = Otitis Media with Effusion
diag.lt.ear	Diagnosis Left Ear	1 = Normal 2 = Wax(impacted) 3 = Otomycosis 4 = Otitis Externa 5 = Acute Otitis Media 6 = Chronic Otitis Media 7 = Otitis Media with Effusion
lftimpairment	Left ear audiometry	0 = no impairment 1 = mild impairment 2 = moderate impairment 3 = severe impairment
rtimpairment	Right ear audiometry	0 = no impairment 1 = mild impairment 2 = moderate impairment 3 = severe impairment

ANNEXURE - VII MASTER CHART

sno	age	sex	standa	responden	religion	fathers_ed	mothers_e	fathers_oc	mothers_c	ho_consan	total_incor	total_mem	type_of_ho	how_many	daily_bath	co_ear_pa	ear_discha	duration_d	block_sens	itching_se	turns_to_c	habit_of_c	if_yes_oft	how_do_y	any_other	snoring	how_often	suffer_sne	family_me	material_u	doctor_co	hair	eyes_disch	nose_disch	oral_cavit	nail_clean
1	10	2	5	2	1	3	1	2	2	1	4000	4	1	1	1	2	1	2	1	1	2	2	0	0	2	2	3	1	2	2	1	2	2	1	2
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dress	bare_foot	right_ear_	left_ear_a	skin_inflan	skin_inflan	discharge_	discharge_	wax_rt_ea	wax_lt_ea	ear_drum_	ear_drum_	tm_bulging	tm_bulging	tm_retract	tm_retract	tm_perfora	tm_perfora	middle_ea	middle_ea	type_of_di	type_of_di	child_repe	child_bend	child_mov	grade_of_i	diag.rt.ear	diag.lt.ear	lftimpairme	rtimpairment
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ANNEXURE IX

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